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OBSERVATIONS
ON
STREET RAILWAYS,

BY
GEORGE FRANCIS TRAIN,

ADDRESSED TO THE
RIGHT HON. MILNER GIBSON, M.P.,
PRESIDENT OF THE BOARD OF TRADE,
LONDON.

SECOND EDITION—WITH APPENDIX.

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Lord John Manners said, he did not take the same view as Sir Benjamin Hall did, that it was the duty of that office to interfere in any way with the paving of the streets of London.

Mr. Hawes would take the liberty of asking his lordship, which department of the Government he considered such a subject referred to?

Lord John Manners : As Chief Commissioner of Public Works, he thought his was not the office. The more proper department, this being a commercial matter, he thought would be the Board of Trade.—*Vide Observer, March 14, 1858.* Deputation from the Metropolitan Parishes to Lord John Manners.

Champion
6-17-30

• Preface to Second Edition.

BIRKENHEAD will have the credit of introducing the first Street Railway on this side of the Atlantic. My application was made in March, and on the 22nd of May the Commissioners affixed the seal to the contract, as arranged with my solicitors, Messrs. Fletcher and Hull. The Ebbw Vale Company have agreed to deliver the iron in July; Messrs. Crowe and Williams are preparing the timber; Mr. R. Main is at work on the carriages, to be ready in August; Mr. Charles Burn, the contractor, will break ground the moment the material is at hand, under the engineership of Mr. Samuel, of London, and Mr. Palles, of Philadelphia, the resident engineer; and, in September, Mr. R. Peniston, the secretary of the "Birkenhead Street Railway Company, Limited," will issue excursion tickets from Liverpool to Birkenhead Park and back for sixpence.

The adoption of Street Railways in Europe is an important event in the history of this iron age. Great success cannot be earned without great labour. "The three P.'s—Perseverance, Patience, and Pluck"—is the annual toast of a Liverpool broker, at the customary dinner to his clerks. Success in Birkenhead is success

in all the cities in Europe. Experiments are expensive, but this is scarcely an experiment. The system has succeeded in America: why should it fail in England?

The thousand pamphlets sent to the Press, Parliament, and Corporations have awakened sufficient interest throughout the kingdom to justify me in printing this edition of fifteen hundred copies, containing in the Appendix reports of several eminent engineers, and opinions of the Fourth Estate.

The Lithograph of the Railway in operation may tend to remove the impression of the *Irish Times*, of a long line of carriages and a shrieking locomotive whirling through a crowded city; and may also answer the question, "Do you intend a stationary engine at Leece-street, Liverpool, or High Holborn, London; or do you propose to tunnel the hills?" Therefore the picture may explain better than the pamphlet; observation being quicker than reflection; the eyes satisfied, the ears are content.

The Commissioners of Birkenhead are being warmly supported by the people, who are competing to have the line laid before their respective doors. This may suggest to other Corporations that the public will be quick to follow their lead in giving the system a fair trial. Already Liverpool has made a favourable report through her engineer, Mr. Newlands, on my application to construct Street Railways in that borough, and on June 28th I met, by appointment, Messrs. Johnson, Bowring Ridley, Clint, Kitchen, Crellin and Shuttleworth, the sub-committee, who will report thereon. Messrs. Clark and Heron, of the Manchester

Corporation, were much pleased with my models, and invited me to a trial in that city. Messrs. Moir, Govan, Dughorn, Donaldson and Dick, of the Glasgow Corporation, saw my plans in London, and suggested a trial line to be laid down from the Cross to the Crescent, by Buchanan-street and Sauchiehall-street. Birmingham and Dublin have my formal application before them; and Messrs. Lewin, Carter, Flinch, Forster, and Sutton, of the London and Greenwich-road Trustees, address me through the Clerk of the Trust, Mr. Charles A. Smith, to say that they "felt favourably disposed to the project, and deem the matter of sufficient public interest to justify their recommending that it should be submitted to a special meeting of the trustees to be convened for that purpose."

When I made up my mind last year to succeed in demonstrating the practicability of these railways in English cities, London was the starting point; but a practical member of Parliament having assured me that most of the great undertakings of the day were initiated in the provinces, instancing "steamboats, railways, gas, water-works, telegraphs—even Rowland Hill was a provincial institution," I applied to Birkenhead for permission to show them a pattern card of an invention that can be extended as long as customers may require. "Show its success elsewhere, and then come to London." This I intend to do. The field is wide; the labourers few. By-and-by the rolling of iron, the cutting of timber, the building of carriages, the erection of stables, the equipping of horses, the making of roads, and the consequent employment of engineers, clerks, contractors, mechanics, conductors, navvies, &c., will be practical proof that in introducing Street Railways into the old

world I have given a boon to the people, and a new source of wealth to the kingdom. During the past fifteen years four hundred millions have been invested in the railways of the country. *Five per cent.* invested in the railways of the city during the next five is *twenty millions sterling!*

All agree that it is a good thing. "Surely if it is so simple and so much needed, why was it not introduced before?" Simply because it was so simple and so much needed. Practical Englishmen in America remarked, "what a place England is for City Railways." Practical Americans in England made the same comment—but the idea began and ended with the suggestion. Vested rights—landed interests—parliamentary red-tapeism, were too formidable a battery to attack; hence the idea was paralysed at the start, and as nobody was inclined to go to the expense of introducing it, nothing was done. In the face of the bankers' conservative stock advice, "Don't be so *sanguine*"—the only word in the dictionary that, acted upon, ever accomplished anything—I have run the risk and expense of inserting the wedge in England, and will shortly prove that the new system is as superior to the old as Burgundy is to Beer—Champagne to Water.

Omnibuses were only introduced into Liverpool thirty years ago, and steamboats, railways, electric wires,* gasometers, iron bridges, free trade, reform bills, and volunteers (the *national guard* of the land), have all been born during the Queen's lifetime. So, with faith, hope, and energy, and considerable money, I shall establish, what a Cunard captain aptly calls, the rich man's comfort and the poor man's luxury. When Liverpool has a good hotel, a decent

theatre, a respectable ferry boat, and Street Railways, the "Borough" should be promoted to a "City."

If I am properly supported by the corporations, the ladies of Lancashire and Cheshire, at no distant day, (instead of being packed in a sardine box with a sweep, as in the present omnibus system, or stowed away in the steerage of the Mersey ferry boats—there is no cabin!) can step under cover at any part of Birkenhead into a commodious railway carriage—ride to the pier—walk under a glass arcade into the saloon of the new ferry boat—walk again under a glass arcade from the floating stage to the railway carriage on the Liverpool side, and be taken to St. George's Hall, or the Philharmonic, and thus effect an important saving in *umbrellas*!

Street Railways in England will soon become a great fact—Birkenhead opens the ball. Liverpool follows. Then Manchester, Birmingham, Glasgow, and Dublin enter the ring; and London cannot well hold back after building the Metropolitan *Subterranean* Railway. A Street Railway can be constructed directly over it in as many months as that will require years. The former costs three thousand per mile, the latter three hundred thousand! In the one you travel in the dark, in the other in broad daylight. The Street Railway accommodates both sexes, while the Metropolitan shuts out one half the population—the ladies! (Who crosses in the Thames tunnel?) The former stops before every man's door, the latter has stations only at intervals. One starts every five minutes, the other every half minute if required. The Metropolitan blocks up the thoroughfare for months, the Street Railway for hours only. Surely

then if London opens wide her gate to permit the Metropolitan to undermine the city, tunnel through sewers, water-pipes, gas-pipes, and cess-pools, at great cost and great inconvenience, she certainly will not shut it in my face when I respectfully ask permission for a fair trial of my Street Railway ?

Are not our streets too narrow? asked the leading Christian banker. By no means. London streets are wider than those in American cities. Ludgate-hill and Cheapside are of course in your mind. But when we remember that there are some five hundred miles of streets in and about London adapted to this system, why select the narrowest to commence with! All see an ink spot on the white table-cloth; but who thinks of examining the fabric? That one black sheep prevents the eye from observing the thousand white ones! First construct a line from Bayswater through Oxford-terrace, and the New Road to the Bank; then another line over Westminster Bridge down those wide solitary streets on the Surrey side to London Bridge, with a branch over Waterloo to the Strand. This would relieve Fleet-street of a thousand omnibuses, and thus make way for a single line down the centre of the city to return by another route.

In conclusion, let me say that the egg will shortly be chipped in this country under my patent, at great cost and labour, and I shall endeavour to prevent my chicken (as is too frequently the case with valuable inventions) from becoming somebody else's hen!

G. F. T.

5, Temple Place, Liverpool.

. OBSERVATIONS ON STREET RAILWAYS,

BY GEORGE FRANCIS TRAIN.

TO THE RIGHT HONOURABLE MILNER GIBSON, M.P.

THE age of Omnibuses in crowded cities has passed. The age of Street Railways has commenced.

America has introduced the new invention of relieving crowded streets, by giving additional facilities for travel; and, as Europe must sooner or later adopt a similar system, I make bold to address you, as President of the Board of Trade, a few comments connected therewith.

While on a recent visit to the United States, I was surprised to find the progress made in what the Americans term *Street Railways*, the English *tramways*, and the French *chemin de fer Americain*. In the cities of Boston, New York, Philadelphia, Baltimore, St. Louis, Chicago, and Cincinnati, the railway cars were displacing omnibuses in all the large streets. Like all practical labour-saving inventions, the people first oppose, then advocate them. They have already become a public utility; and Americans would miss their railway car as much as the English would their penny-postage system. The street railway is a fixed fact. It has had a fair trial, and has met with striking success.

The Street Railway is creating, and will continue to create, the same revolution in large cities that the telegraph on the land, and the electric cable under the ocean has done in commerce.

As the locomotive supersedes the stage-coach on the shore, and the steam-boat displaces the sailing vessel on the sea, so will Street Railways make omnibuses give way to the force of progress.

The railway from Liverpool to Manchester, in your recollection, astonished the world. Now there are seventy thousand miles ! Brunel's genius progressed from the Great Western of 2,000 tons to the Great Eastern of 20,000 tons in twenty years ! Now a thousand steam-boats connect the mother land with her colonial children, as the arteries carry life from the heart.

England, first in iron-railing the country with steam, is last in iron-railing the city with horse-power. But the enterprise that stimulated the Thames Tunnel, the Tubular Bridge, the Crystal Palace, and Great Eastern, will not long submit to the miserable steam-packets from England to France, ferry-boats from Liverpool to Birkenhead, or to omnibuses blockading the leading city thoroughfares. The latter enterprises, I am confident, on the improved system, would prove as great financial successes as the former have financial failures.

This paragraph, from the *Times*, shows that Ireland is wide awake on the subject, while England sleeps :—

IRISH TRAMWAYS.—As there is now no doubt that the bill of Sir Robert Ferguson will become law in the course of the ensuing session of Parliament, a prospectus has been issued of the City of Dublin and Suburbs Tramway Company, under the Limited Liabilities Act. A very flourishing account is embodied in the preliminary notice of the success of tramways in New York, chiefly founded on the statistics supplied by the correspondent of the *Times* in New York. It is proposed that the capital of the Dublin Company should be £100,000, in £10 shares, to be paid as wanted ; to run five lines of four miles each through the suburbs, centering in the business part of the city, and connecting the railways and quays.

The Irish journals are fully alive to the importance of Sir Robert Ferguson's bill. Will England and Scotland allow Ireland to take the lead, or rather will not Parliament pass a general bill for the kingdom?

The advantages of Street Railways over Omnibuses are so well set forth by Alexander Easton, C.E., of Philadelphia, in "*A Practical Treatise on Street or Horse-power Railways*," that the following extract will be of interest:—

Popular prejudice is the great enemy with which the advocates of innovation have had to combat, and, strange as it may appear, it is nevertheless practically true, that the more useful the measure advocated, the greater has been the amount of opposition brought to bear against it, even by parties who have subsequently been benefited by the very measures they sought to defeat.

A glance at the early history of turnpike roads will clearly shew the difficulties encountered by their projectors; but which, when overcome, became the favored improvement of the age, and legislative halls sounded with angry debate for their protection, so soon as railroads were proposed, denouncing them as a nuisance, and their corporators as visionary speculators. So it was with the introduction of canals, steamboats, and even gas, the arguments against which, brought forward by the opposition, having, in each instance, exhibited the grossest ignorance of science, and of the practical effect of the proposed improvements, all of which is applicable at the present day, and has been experienced by those who proposed the introduction of street railways.

The interest which operated against turnpike roads was that of the muleteer; the interest which operated against railroads was that of stage coach and wagon proprietors, and in the case of street railways, the opposition is from omnibus companies and antiquated stage communities, whose palpable interest it is to defeat a measure, which invades their imagined rights, by the substitution of a means of communication so manifestly useful and necessary, as to completely destroy the system to which they are so faithfully wedded. They use the means employed in their interests to influence, and lead on opposition, until having obtained certain provisos in the charter for their especial benefit; the time has arrived to fraternize with the enemy—when they at once become strong advocates for street railways; and unfortunately, without the influence to quench the flame of prejudice which they have ignited.

* * * * *

That increased facilities for commerce and transportation cause greater influx of traffic and travel to the principal streets of large cities, is indisputably recognized, and where the consequent inconvenience of narrow thoroughfares cannot be corrected, it must be modified by economizing time and space.

Time is economized by regularity of transit; the cars being quickly stopped by the application of the brake, the most refractory horses are immediately arrested; while the whole operation becomes so mechanical, that the horses, when accustomed to the signals of the bell, stop or start without any action on the part of the driver, by which means a time table can be effectively used, and business men are not subjected to delays incident to the old—and we trust soon to say obsolete—*omnibus system*.

Space is economized, because omnibuses, (the most numerous and dangerous portion of the travel,) surging from side to side of the streets, are abolished, while the work, heretofore inadequately performed by three of those vehicles, is easily accomplished by one car, in half the time, notwithstanding it is concentrated and confined to one channel.

By the convenience afforded the public by the cars, the side-walks are relieved from pedestrians, and the centre of the street from vehicles; a seat can be taken and vacated without trouble or danger to the occupants of the car, whether invalid or infirm, and the rails present such an even and smooth surface for the wheels of ordinary vehicles, that the drivers avail themselves of their continued use. It is a most difficult matter to dispel from the ignorant or prejudiced mind, the idea, that the railways will be constantly occupied by continuous trains of cars, which beyond a doubt would block up the street, obstruct the travel, and be a most confirmed nuisance, ruinous to the locality; whereas in reality the rails themselves form no obstruction, but rather invite vehicles on the track; the passage of the little car is momentary, as it moves quietly along the street; and the nuisance occasioned by the rattling of omnibuses over the rough stones is abolished, leaving the streets nearly as noiseless as when covered with snow; the advantages of the smooth rail are thus neither few nor unimportant. Any one, familiar with the laws of momentum, can readily understand the effect of the constant jar to buildings, occasioned by the passage of omnibuses, and particularly in the thronged thoroughfares, where buildings are most elevated.

If, however, the solidity of construction should prevent injurious results, there are many minor disturbances—if not so dangerous, almost as annoying,—which cannot be prevented, such as the constant vibration of pier-glasses,

gas pipes, &c., (as occasional showers of white flakes, and plaster fragments attest,) without enumerating the very serious annoyance to the invalid.

The great reduction of friction on the car, and the smoothness of the rail, obviate all these evil effects by removing the cause.

Here is a picture. A wet day—every corner of the side-walk crowded with impatient pedestrians, each one anxiously peering up or down the street in search of the particular omnibus among the fifteen or twenty approaching, to carry him home, which, with as many more coming in the opposite direction, so effectually choke up the street, that the drays and carts unable to cross at the intersections, render the highway impassable to private vehicles, and are therefore driven to other streets, avoiding danger and delay; the omnibuses crowded to excess, cannot accommodate the vexed crowd on the side-walk, and the sudden halt with imminent risk of collision, with the drivers' "plenty of room, sir," with twenty inside—by no means softens the temper either of those in waiting, or those, who seated—not comfortably—look upon each moment of unnecessary delay, as an infringement on their rights.

Here is another. Not an *omnibus* is seen in the whole length of the street—carriages, drays and carts move with comparative ease, little strips of iron are laid along the street, upon and across which, vehicles pass without inconvenience, and which, the drivers (particularly of private carriages) evidently seek; there is no crowd, for the little cars glide along rapidly and frequently, accommodating everybody; at a slight signal the bell rings, the horses stop, the passenger is comfortably seated, no rain drops in from the roof, the conductor is always ready to take the fare when offered, and the echo, "great improvement, this," is constantly repeated.

There is no accident on record, of injury to any passenger of street railways, whilst occupying a seat in the car; some few have happened to boys and incautious persons, from drunkenness, jumping from the cars whilst in motion, &c., but even these, are few in comparison with omnibus accidents.

Those remarks are as applicable to English as American cities—and in no place are they more so than to London. The *Times* was first to advocate the change.* Speaking of the London Omnibus Tramway Company, November 18th, 1857, it says:—

* *Vide* August 14th, 1856; November 18th, 1857; February 26th, 1858; March 17th, 1858, *City Article*.

The plan, as many of our readers will be aware, has been tried and adopted with very great success and considerable public benefit in Paris, Lyons, New York, and Boston; and the practicability of it has therefore been demonstrated beyond question. A tramway of this description has been for nearly three years in use between Paris, Boulogne, and St. Cloud; and is now extended to Sevres, and Versailles, and also in Lyons, New York, and Boston; and large omnibuses, carrying from sixty to eighty passengers each, are thereon propelled by two horses at a speed varying from eight to ten miles an hour, with great facility. The part of the Metropolis on which the experiment is about to be tried commences with the road from Nottinghill-gate, *via* the Grand Junction-road, New-road, City-road, and Moorgate-street to the Bank, which branches to the Great Western and London and North Western Railways, and to Fleet-street, *via* Bagnigge-wells-road. The length of this line with sidings will be about eight miles and a-half, and the road, with the exception of the inclines at Pentonville, is broad and eminently qualified for the trial. In the event of its success, the company next contemplate the extension of the plan to the road from Edmonton to the city, by way of Kingsland and other parts of the Metropolis. The tramways when laid will be perfectly flush with the general surface of the roadway, and will not in any way interfere with the passage along and across it of any ordinary road waggon, or carriage; and as the new omnibuses in passing along will be confined to the tramway, which will consist of a double line in the centre of the roadway, the sides of the road, and indeed the entire width, except during the instant of passage, will be free to the general traffic, which will thus be carried on without interruption. The great economy which will be effected by the adoption of the new tramway system, will enable the company to carry the public at reduced fares, and at a greater rate of speed. The omnibuses will be large and commodious, with flanged wheels and axles radiating to the curves, and, if found desirable, might be constructed with first and second-class apartments. * * *

The facility for starting and stopping the tramway omnibus, with improved brake, will be quite as great as the ordinary road omnibus, so that there will be no loss of time on this account. It is this power in horses of starting or stopping almost instantaneously which makes the tramway for short distances and frequent stoppages equal, if not superior, to the railway with steam power. If the system of fixed stations or stopping-places along the route were adopted in lieu of stopping at the wish of every passenger, much time might be saved; but in New York, we believe, the tramway omnibuses stop wherever they are required to take up and set down passengers, and no inconvenience is found to arise from this system of working them.

This bill was defeated mainly through the opposition of Sir Benjamin Hall, Bart., Chief Commissioner of Public Works.

The *Observer*, (February 21st, 1858) in recording the proceedings of the deputation, consisting of Messrs. Coates, Stevens, James Samuel, the engineer of the company, and others, who forcibly brought the merits of the scheme before the Commissioner, says :—

Sir B. Hall said he had maturely considered this plan, and of all the monstrous propositions which had ever been made or presented to Parliament this was the worst. He felt bound frankly to tell the deputation that, feeling it his duty to protect the interests of the Metropolitan public, he should be bound to give this measure his most determined opposition. Here was a trading company, seeking to appropriate to their own exclusive use the property of the public, which the public roads were, and for their own trading purposes and private benefit. If they desired the exclusive use of a road for their own vehicles, they should have taken the same course that other persons did, and have come to Parliament to obtain powers to make a road for such purposes, but here the company actually proposed to take to themselves 16 feet out of the width of the thoroughfares of the Metropolis. It was utterly impossible that the iron rails or plates upon which the carriages were to run could be laid on macadamised roads, for instance, with a certainty of always being kept on precisely the same level as the road; and carriages running diagonally against the plates would be subjected to have their wheels torn off, and most serious accidents would result, whatever precautions might be taken even. The weather would at times effect this. The right hon. baronet ridiculed the idea of setting up the tramways in the Champs Elysées, or in New York or New Orleans, as an example, as they bore no analogy to the thoroughfares of the Metropolis; and after stating a variety of other objections, he expressed a hope and a belief that Parliament would dismiss so monstrous a proposition at once. The city of London and the lines leading to the City were not even now sufficient for the carriage and heavy goods traffic; and if a private company, merely for the sake of their own omnibuses, were to take 16 feet of roadway out of, in some instances, 25 feet, the case would be rendered a thousand times worse. Every parish through which the line past petitioning against the bill, and his advice to its promoters was that they should withdraw it at once.

The Cardinals endeavoured with their antiquated omnibus-system

of astronomy, to make the sun revolve around the earth, by imprisoning Galileo—learned professors saw no safety in Davy's lamp—distinguished physicians had no faith in Harvey's circulation—and Sir Benjamin Hall, if the short-hand notes taken at the interview are reliable, seems to have thrown cold water on the deputation, partly to please his constituency, but mainly, because an accident happened to his carriage in passing some coal tramways in Wales.*

From Sir Benjamin's comments, he would have been among those clever men who ridiculed Watt's engine, sneered at Fulton's steamboat, and laughed at Stevenson's locomotive; but as these progressive minds triumphed over those who considered free trade in improvement criminal, so the practical working of Street Railways must succeed in making advocates of the theorists who do not understand them.

That clumsy bungling affair which Sir Benjamin alludes to in Paris, has always been an eye-sore to the Emperor, and gives no better idea of the real Street Railway, than does the *chemin de fer Americain* on the Neva's banks, at St. Petersburg,—the horse-power tramway from Carnarvon to Nantlle, or the Omnibus Railway along the docks of Liverpool.

Sir Benjamin Hall did not meet the arguments of Messrs. Coates and Samuel, except by prejudice. Arguing against facts is difficult, and overriding stubborn truths impossible.

The following statistics which have just been sent me from New York, may show Sir Benjamin that Street Railways are as much a reality in America, as cotton factories and iron mines are in England.

* Mr. Verey said, those tramways would wrench off the wheels of the carriages, and Sir Benjamin Hall had stated, that his own carriage wheels had been so wrenched off twice by tramways in Wales.—*Vide Observer*, March 14th, 1858. Deputation of Parishioners to Lord John Manners.

New York, November 28, 1859.

George Francis Train, Esq.,

9, Square Clary, Paris.

Dear Sir,

I duly received yours of the 7th instant from Paris, and herewith send you the required statistics.

They are obtained from the sworn statement, which, by law, each Railroad has to furnish, under oath, to the Comptroller of the State, and is taken from his archives.

Their last report is for the year commencing October 1, 1857, and ending September 30, 1858. The business on each of the following five city railroads this year, has been from 10 to 20 per cent. better than it was last year. But they do not send their reports to the State Comptroller until next month, and I cannot get them till after that time.

Statement of the earnings, cost of operating and maintaining the five city railroads of New York and Brooklyn, the number of passengers carried by each, the number of accidents occurring on each, and the dividend paid by each for the fiscal year, ending October 1, 1858.

BROOKLYN CITY RAILROAD.

POPULATION OF CITY—200,000.

Length of City Roads operated—21 miles double track.

	Dols.	Cents.
Capital Stock paid in is	1,000,000	
Total cost of road, equipment, and its real estate.. ..	1,038,839	9
Weight of rail per lineal yard, is 64 pounds.		
Number of passenger cars for 20 passengers each, is 100.		
Number of passengers carried during the year 7,705,839		
Number of miles run during the year was 1,994,186		
Weight of each passenger car, 4,700 lbs.		
Rate of fare for adults 5 cents, for children 3 cents each person.		
Aggregate amount of gross earnings for the year ..	395,026	70
Aggregate amount of operating and maintaining expenses ..	288,771	22
Amount of dividend declared and paid, 8 per cent. on ..	1,000,000	80
Amount carried to surplus fund.. ..	18,778	85
Total amount of surplus fund to October 1, 1858, including		
last item	57,125	58
Accidents to persons during the year—five.		

2ND AVENUE RAILROAD IN NEW YORK CITY.

Length of 2nd Avenue Railroad operated, 8 miles single track.

	Dols.	Cents.
Capital Stock paid in 627,000 dols., authorised	800,000	
Total cost of road, equipment, and its real estate, ..	1,005,403	: 71
Weight of rail per lineal yard, 72 pounds.		
Number of passenger cars owned by the company, 80.		
Number of passengers carried by them during the year, 4,504,645		
Speed per hour including stoppages, average 5 miles.		
Aggregate amount of earnings during the year, ending October		
1st, 1858.. .. .	227,457	: 70
Aggregate amount of operating and maintaining expenses ..	117,851	: 96
Amount of dividend declared and paid, 6 per cent. on		
627,000	37,620	
No accident to persons during the entire year.		

3RD AVENUE RAILROAD IN THE CITY OF NEW YORK.

Length of 3rd Avenue Railroad operated is 6½ miles double track.

	Dols.	Cents.
Capital Stock all paid in is	1,170,000	
Total cost of road, equipment, and its real estate ..	1,378,090	: 74
Weight of rail per lineal yard, 72 pounds.		
Number of passenger cars owned by the company, 70.		
Number of passengers carried during the year, was 7,945,462		
Number of miles run by this road during the year, was 1,460,000		
Average weight of each passenger car, 4,000 pounds.		
Rates of fare for adults 5 cents. and for children 3 cents each.		
Average speed per hour including stoppages, 6 miles.		
Aggregate amount of gross earnings for the year	446,504	: 13
Aggregate amount of operating expenses	242,811	: 53
Amount of dividend declared and paid 8 per cent. on 1,170,000	93,600	
Payments made for purchases of real estate	77,309	: 62
Amount added to surplus fund	16,886	: 93
Total number of accidents during the year was to six persons.		

6TH AVENUE RAILROAD IN CITY OF NEW YORK.

Length of 6th Avenue Railroad operated is 4 miles double track.

	Dols.	Cents.
Capital Stock paid in is	750,000	
Total cost of road, its equipment and its real estate is ..	855,957	: 22
Weight of rail per lineal yard is 74 pounds.		
Number of passenger cars in use and owned by the company is 70.		

Dols. Cents.

Number of horses and mules in use, owned by the company, is 422

Speed per hour, including stoppages, 5 miles

Number of passengers carried during the year was 5,612,357

Number of miles run by this road during the year was 950,572.

Average weight of each passenger car, 4,000 pounds.

Rates of fare for adults 5 cents, for children 3 cents each.

Aggregate amount of gross earnings for the year was .. 280,617 : 86

Aggregate amount of operating and maintaining expenses was 178,226 : 24

Amount of dividend declared and paid, 10 per cent. on 750,000 75,000

Total funded debt of the company paid off and extinguished 12,844 : 82

Amount contributed for the year to the surplus fund .. 14,546 : 80

No accident to persons during the whole year.

8TH AVENUE RAILROAD IN CITY OF NEW YORK.

Length of 8th Avenue Railroad operated is 5 miles double track.

Dols. Cents.

Capital Stock all paid in is 800,000

Total cost of road, its equipment and real estate is .. 756,142 : 87

Weight of rail per lineal yard is 72 pounds.

Number of passenger cars in use and owned by the company is 61.

Speed per hour including stoppages is 5 miles.

Number of passengers carried during the year was 6,768,203.

Number of miles run during the year was 1,028,142.

Rates of fare for adults 5 cents, for children 3 cents each

Aggregate amount of gross earnings for the year was.. .. 338,410 : 19

Aggregate amount of operating and maintaining expenses 177,753 : 91

Amount of dividend declared and paid, 12 per cent. on 800,000 96,000

Amount carried to surplus fund for the year 64,656

Number of accidents to persons during year, one.

R E C A P I T U L A T I O N .

Number of passengers carried by Brooklyn city roads for 1858					7,705,839
Ditto. ditto. 2nd Avenue city roads, New York, for 1858					4,504,645
Ditto. ditto. 3rd Avenue, ditto. ditto. ditto.					7,945,462
Ditto. ditto. 4th Avenue, (details omitted) ditto.					2,066,000
Ditto. ditto. 6th Avenue, ditto. ditto. ditto.					5,612,357
Ditto. ditto. 8th Avenue, ditto. ditto. ditto.					6,768,203

Total number of passengers by the five city roads for the year 34,602,506*

Total number of accidents on all the city roads for the year, twelve.

* The *Times* records these returns, and says, "These railways, which are

•

DIVIDENDS IN 1858.

Brooklyn City Railroad Company, semi-annually, 8 per cent.

2nd Avenue railroad in the City of New York	6	„
3rd Avenue ditto. ditto. ditto.	8	„
6th Avenue ditto. ditto. ditto.	10	„
8th Avenue ditto. ditto. ditto.	12	„

The above covers statistics for 1858. I will send you the reports of the present year as soon as published.

Yours respectfully,

GEO. T. M. DAVIS.

Mr. Scholefield, M.P., one of the deputation that waited on Lord John Manners, Chief Commissioner of Public Works,* said :—

My experience in New York is favourable to such a scheme. The tramways there are wider than is proposed here, and carriages, much wider than our omnibuses, run upon them. I have seen carriages running on and across tramways at all possible angles, and I never saw any accident, or jolting, or inconvenience. The New York omnibuses hold forty or fifty people, and although the place I had to go to was four miles by the omnibus route, and only three miles by another route, I always preferred the tramway, as being more agreeable than any other mode of conveyance. The New York tramways have been most successful.

One of the objections made against tramways came from the Sewers' Commission, who thought that the public would be inconvenienced. The Gas Companies were also opposed to the system for similar reasons.

Mr. W. Haywood, Engineer of the City Sewers' Commission, brought up the report (Feb. 1858), upon the subject of Omnibus Tramways in the City, which, after reviewing the projects of the company, came to the conclusion that the scheme would be fraught with public inconvenience, and would hinder the Commission in maintaining those highways in a fitting condition for general traffic.

tracks laid down in the streets, the rails made of a peculiar form to avoid the objections to the ordinary rail, all concentrate in the business part of New York, and take the most of the travel to and from it.”—*Times' New York Correspondent*, April 12, 1859.

* *Observer*, March 14, 1858.

James Samuel, C.E., in his valuable report (Nov. 4, '1857), thus alludes to this question:—

Inasmuch as the general wear and tear of the highway will be greatly diminished, from a large proportion of the traffic being transferred to the tramway, which would otherwise come upon the road, it is reasonable to suppose that the boards and surveyors of highways will be interested in giving the project their support.

The tramway being constructed with longitudinal bearings, will enable it to be diverted with great facility during any temporary repairs to gas, water, pipes, or sewerage, none of which will in anyway be interfered with.

Sir Benjamin Hall's opposition represented the Marylebone Parish, and the chief argument used by the deputation to Lord John Manners,* from the parishes of St. Pancras, St. Mary, Islington, St. James, Clerkenwell, Shoreditch, and Kensington, against tramways, was on account of danger from accidents.

Mr. Hodges (Marylebone), *was prepared to show that it might be fraught with the greatest danger to the lives and limbs of the public, and impede the public traffic.* It was perfectly ridiculous to set up the tramways in New York as any criterion for this metropolis. The projectors of this tramway scheme proposed to take upwards of 16 feet of the centre of its roadways, and, so far as the Marylebone-road was concerned, the greatest width at any part was 48 feet, but that was only for a very short distance, and there was at one point, for a distance of 277 yards, a width of only 32 feet. He would ask his lordship how the general public traffic could be carried on, supposing this company to monopolise 16 feet out of 32 feet, thus leaving only eight feet on either side.

Simply because the railway *does not* monopolise any space. The greater portion of drays, carts, 'buses, private carriages, occupy the rail, turning out only when the passenger car arrives, when they again take the track as it is so much easier for the horses, and less wear and tear for the teams.

The Rev. R. Eckett (St. Pancras) begged to remind the noble lord, that under the Metropolis Local Management Act, the subject of roads and sewers was

* *Observer*, March 14, 1858.

one with which that office had something to do, and therefore they had come there to ask him as the head of that department of the government, *to aid the local authorities to protect the lives of Her Majesty's subjects on the public highways*, by giving a determined opposition to the second reading of the bill.

Mr. Elt (Islington) said :—

That a very large proportion of the New Road and City Road were macadamised roads, and it would be a matter of *continued probability that stones, &c., would get into the grooves of the trams and endanger the lives of the public, possibly by upsetting the omnibuses themselves.*

What a strange idea these gentlemen have of *Street Railways*; many of the American streets are macadamised, but who ever heard of a car upsetting? Why, the fact is, the improved rail being flat—unfortunately for Mr. Elt's argument—there is no groove for the stones to “get into.”

The fact before recorded, that over thirty-four millions of passengers passed over the horse railways of New York and Brooklyn in 1858, with only twelve accidents, is a practical reply to that question. Thirty-four millions! More than the population of the United States and Canada, or of Great Britain and Australia—one-fourth the entire number of passengers carried on the railways of the United Kingdom the same year; or, to make it more striking, three times the number carried in Scotland, and four times as many as passed over all the Irish railways, *and yet, only twelve persons injured by accidents! And these chiefly through their own carelessness.*

Another argument was advanced by Mr. Hawes, (Shoreditch):—

That those who kept carriages, or tradesmen *who required carts for their business, could not get up to their own doors, or certainly could not stand there, and so the general traffic would be greatly obstructed.*

Mr. Mackinnon, M.P., who conversed with me on the subject, acknowledged that this was the main objection to the plan.

There are, proportionately, more private carriages in Philadelphia than any city of the union, and there are more street railways.

The streets are not so wide as on the line discussed by the Metropolitan deputation, and the opposition to the railway from land-owners, carriage-owners, shopkeepers, and householders, was almost as warm as the opposition of hand-loom weavers to steam and water power in the manufacturing districts. But now, that experience has shown their advantages, the same ratepayers, who before hung back, would be the first to express indignation were the rails to be removed, and the old omnibus system replaced. The track being laid in the middle of the street ample space for vehicles is left on each side.

The following letter just to hand, bears upon the above objection, and confirms all arguments in favour, by showing active and successful operations of the Philadelphia roads:—

Philadelphia, December 12, 1859.

George Francis Train, Esq.,

5, Temple Place, Liverpool.

My Dear Sir,

On reading your letter to Mr. Morris, I am fully convinced that the great scheme of building passenger railways in the cities of Europe, must soon be accomplished. The question is, who will introduce them, and when? You write for statistics of our roads. Details I cannot give you in the absence of their reports, therefore I can only generalise by giving you the names and a few ideas as to their working.

We have now in active operation in this city, the following roads:—

RUNNING EAST AND WEST.
Spruce and Pine-streets
Chesnut and Walnut-streets
Market & West Philadelphia-streets
Race and Vine-streets
Green and Coates-streets
Upper Ridge & Lower Ridge-streets
Girard Avenue

RUNNING NORTH AND SOUTH.
Second and Third-streets
Fourth and Eighth-streets
Fifth and Sixth-streets
Tenth and Eleventh-streets
Thirteenth and Fifteenth-streets
Seventeenth and Nineteenth-streets
From Germantown to Philadelphia

The roads average about seven miles single track. The cars go up one street and down the other, and, by a system of checks and correspondence you can step into a car opposite your door and go to any part of the city.

We have one hundred and five miles of street railways, and some ten millions of dollars invested.

Philadelphia contains a population of 600,000. If so many railroads can succeed with us, what, in all probability, would be the result of one or two main lines with branches, either in London or other cities?

The most eligible place should be selected to commence the work; first build a short road, in order to allow an opportunity to those who may have prejudices existing against passenger railways, to examine into the whole thing *pro* and *con*. There is nothing, after all, like ocular demonstration; it carries conviction with it unmistakable in its character. You cannot be the loser by such a course, inasmuch as the result is already established beyond a single doubt. How could it be possible for the thing to be a failure in any of the thickly inhabited cities of Europe, when we have no instance here of a road failing to pay dividends when properly conducted? By these roads, cheapness, with increased facility, are at once accomplished; you have only to demonstrate the thing, to have hosts of advocates. The rails should be constructed and laid down, so that the travel for carriages will not be obstructed in the least. If I mistake not, you will have great opposition in your large cities, from the very fact of people imagining that these railways obstruct carriage travel. You can assure them, that the rail is so made as to be an advantage rather than an objection. The shopkeepers, so far from objecting to these railways, are nearly all stockholders, and from opposing in the first instance have become their strongest supporters.

Great improvements have been introduced since the first roads were built, and Europe can now avail itself of America's experiments.

Depend upon it, there is nothing that will prove so acceptable to the European public as a complete system of street railways.

Yours very truly,

E. FREEMAN PRENTISS.

(See Map.)

Strickland Kneas, Esq., the Chief Engineer and Surveyor of Philadelphia, in his report (October 12, 1858), to J. M. Gibson, Esq., Chairman of the Special Committee on Passenger Railways, says:—

As to the general usefulness, we can take as a precedent upon which to base an opinion, the great advantage that the present omnibus system

imperfect as it is, affords to all classes of our community. The rapid increase in the number of omnibus lines, each yielding a handsome revenue upon the investment, proves conclusively the large number benefited; and the saving of time to those whose residences are at a distance from the business mart, as well as the benefits accruing to the merchant in rendering his store or counting-house accessible from all sections of the city without fatigue or loss of valuable time, will secure the hearty co-operation to any improvements in the present arrangements that may be suggested.

The advantages of a railroad car over an omnibus, as now used, is self-evident, not only to the passengers, but to those who may reside upon the streets through which the route may be located. The construction of the cars is such as to afford the greatest comfort to passengers, not only in their ingress and egress, but while passing to their destination—the width of the car being equal to the distance from hub to hub of an ordinary coach. The interior proportions will be sufficiently large to avoid many discomforts now so justly complained of.

To the residents upon the route one great advantage will be the relief from the incessant din attendant upon the rapid transit of heavy coaches, so injurious to the invalid, and now urged by many as a serious objection to living upon an omnibus route; their rapidity of motion and security will also be at once appreciated—moving, as they can, more rapidly, with less noise and greater safety than the cumbrous vehicles that now, to accommodate a passenger, or to avoid apparent danger, depend upon the strength of the driver and the willingness of stubborn horses; while with a city passenger *car*, the horses require no lines, further than for guidance around curves and keeping them within the track; the application of a well-arranged brake alone causing, if necessary, an instantaneous stoppage. They are, therefore, in crowded thoroughfares, attended with much less danger than vehicles of ordinary construction and similar motive power.

Their introduction will prevent the streets being, as now, blocked by a double, and frequently a treble row of coaches, creating an intolerable annoyance to the business man, and will afford to the community greater accommodations in every particular wherein they consider the present system advantageous.

Again, he says:

By increasing the gauge to five feet two inches, vehicles travelling upon the track, will use both rails without injury to the iron or pavement, and the

wagon-edge of the rail will offer no impediment to turning out, should a heavy eam be overtaken by a car, and will cause an increased revenue to dray men, carters, &c., by enabling them to haul a larger amount more expeditiously with the same horses.

The mere circumstance of having a railroad track properly constructed upon a street, which to many seems an insuperable objection, is, in my opinion, none whatever, when that track is used solely by horse-power.

One great difficulty regarding its introduction, is to dispel from the minds of those who are most strenuous in their opposition, the idea of an extended train of heavily laden cars, drawn at a great and unmanageable velocity by steam-power, or where this extreme is not reached, we have the effect of the imperfect track on Third-street to combat; but the roads under consideration are for the use of the same motive-power as the carriages for which is claimed the exclusive right of the highways, and offers less obstruction and danger than an omnibus whose course is erratic, frequently producing a fractured axle or wheel when least expected.

The objection to a single track in the middle of a fifty-foot street, as interfering with the requirements of adjoining tenements is one which will be waived so soon as the experiment is made, for in all cases the carriage-way is twenty-six feet wide, giving a clear space on each side of the rails of ten feet five inches, and of the car in passing—which is but momentary—nine feet six inches, sufficient for all household purposes, and offers no impediment to builders when occupying the street with materials of construction, as it infringes but six inches upon the distance from curb, now allowed them by law.

The further objection, that the passage of cars will interfere with the traffic upon the highways is equally untenable, as they will, in fact, be advantageous in keeping the current more perfect; for, should a street be occupied to its legal limits with building materials, there is but room for the passage of *two vehicles*: they are therefore confined to specific tracks when there are no rails, then why not allow one stream of carriages to take the rails and follow or precede the car—collisions would be less frequent, and the constant jams caused by three coaches endeavouring to pass through a space sufficiently wide for two only, would be prevented.

Mr. William Haywood, Surveyor of the London Commissioners of Sewers, in his last report, recommending tramways, says:—

1. The diminution of friction, the consequent facilitation of the draught of vehicles, and reduction of the strain of horses.

2. The diminution of noise and vibration, and the increased comfort, both to travellers and inhabitants, consequent thereupon.

3. An increased duration of surface, the consequent diminution in the frequency of surface repairs, with the inconveniences attending such reparations.

In addition to the foregoing they are very useful in streets having much pedestrian traffic, where the footway space is small; they prevent to a large extent the splashing from the wheels of vehicles, are always cleaner and drier than ordinary pavements, and are more readily kept clean by the scavengers.

This age is practical—save time and you save money—show it an improvement and how soon it is adopted. Free trade in passenger railways is more worthy of English liberality than protection in omnibuses. The day has come to introduce them, for London is all the time crowding for want of more room.

RAILWAYS IN THE CITY.—Do the objectors to city railways (says the *City Press*), know that a million and a-half strangers pass through the City every day? Do they know that more than 8,700 cabs and omnibuses, and more than 9,000 waggons and carts pass over London-bridge daily? Do they know that 70,000 persons traverse London-bridge daily in vehicles, and above 100,000 on foot? Do they know that Messrs. Pickford, and Chaplin & Horne, are perpetually barricading the streets with chests and hampers and hop-pockets, which they would rather not bring into the City at all, but hurry to their several destinations by continued and connected lines? Have they, in fact, thought about the question as one of facts and figures, or only seized on a point to furnish an idea for a "neat speech?" The most effective and the easiest oratory is declamation, and if you declaim against an assumed misappropriation of money by a public body, you make sure of carrying your audience with you.

The Street Railway is an important link in the chain of progress. What is more interesting than to run along the path of improvement from the child Asia to the man Europe, stopping a moment to reflect at the slow-coach-omnibus-system at the half-way station of those middle ages when credulity made up for intelli-

gence—when men did the work of horses, and palanquin and sedan chair made way for cab and bus—when captains went to sea without a compass—sailed without chronometers—when geographical knowledge comprised a little patch of sterile land—when philosophy was without scale—astronomy without demonstration—when learning had no printing press, writing no paper (the tax on which you have laboured so industriously to remove,) and paper no ink.

Those were the days of wax and birch bark parchment—stereotyping on wood and not leaden types—when they made war without powder, shot, mortars or cannon—without Minie, Colt, or Armstrong—when magnetism had no telegraph, iron no rails, steam no boilers. When flint and steel, instead of lucifer match, made the fire, and the sun-dial instead of the watch told the hour—when trade was without books—correspondence without postage—when merchants kept no ledgers, and shopkeepers no cash books. Surgery had no anatomy then, emetics no ipecacuanha, agues no quinine, clothing no factories, and the diligence had not even succeeded the saddle horse.

All those days are with the past. The photograph has displaced the daguerreotype. The stereoscope is pushing away the photograph. The telegram saps the brains of the mail bag, and the sewing machine gives antiquity to the "Song of the Shirt."

Battering-rams, and bows and arrows were not used at Solferino. The gas light supersedes the cocoa-nut lamp. The quill followed the thorn bush, the steel pen the quill, and who so far behind the age as not to use the copying press? Arkwright's cotton jenny coined pounds in England, while Ely Whitney's cotton gin coined dollars in America. So will the introduction of Passenger Railways confer a blessing upon the public and add wealth to the nation.

Let me try, said Fulton, and the steamer went four miles an hour; now the rivers and lakes are filled with floating palaces.

Let me put the wire between Washington and Baltimore, petitioned Morse, and all the world wondered! Now the girdle is about to be put about the earth, as Shakespeare said, in forty minutes. Nothing was ever accomplished without talking. How could the government live without an honourable opposition? Truth is sifted through argument. All new inventions must pass through the fiery furnace of scepticism. Nobody believes a fact till demonstrated.

England has been fifty years in introducing the American-volunteer system, but, it is to be hoped, that as many weeks will not pass before she gives a fair trial to the American passenger railway.

These are some of the points used in the case of the London Omnibus Tramway Company.

The population of London, resident and occasional, has so rapidly increased, and is multiplying so fast as to exceed the capacity of the leading thoroughfares.

The Metropolitan Board of Works have occupied themselves in making new streets, widening others, and removing obstructions outside the city boundary. The city authorities have opened Canning-street, Victoria-street, and improved others of the thoroughfares, but none of these measures have succeeded in relieving to any sensible extent, the great thoroughfares of Fleet-street, Holborn, Ludgate-hill, Newgate-street, Cheapside, and Poultry; the traffic increases faster than a passage for it can be constructed, and the difficulties gain ground daily.

To buy up the property right and left of Fleet-street, Newgate-street, or the Poultry, would require the whole wealth of a German State; and, therefore, to widen those thoroughfares is out of the question; to make new streets parallel to them would incur almost as great an outlay.

All schemes for a Metropolitan railway have utterly failed.

One hundred and thirty-four omnibuses daily run to and from Paddington, Bayswater, and the city, *via* Holborn, Newgate-street, and Cheapside, making 1,312 journeys daily through those thoroughfares; and there are also thirty-four other omnibuses running to and from Bayswater, *via* Fleet-street, Ludgate-hill, and Cheapside, making 280 journeys daily; thus, practically to

serve this district, 1,592 omnibuses, carrying about 25,000 passengers, daily pass through the most crowded streets in the city.

In addition to the above, there is a continuous and increasing stream of cabs. The number of cabs in the Metropolis increased from 3,297, in 1852, to 4,505, in 1857.

Thus, we have confined thoroughfares incapable of being widened, and a traffic daily increasing. The question to be solved is this :—

Can the traffic be compressed into a smaller compass, or diverted without disadvantage to the traveller? * * * * *

Those who judge only by the antiquated tramway in the coal districts of Monmouthshire and South Wales apprehend that the rail must rise above the surface of the road, and so injure, or even tear off, the wheels of ordinary carriages. Such an apprehension is absolutely groundless, and by engineers deemed absurd.

By adapting omnibuses to these tramways, one vehicle with two horses will carry sixty passengers, instead of twenty-one, and the fares may be reduced 33 per cent.

The bulk of the traffic otherwise passing through the narrow and crowded thoroughfares of Newgate-street, Cheapside, and Poultry, and part of that passing through Fleet-street and Ludgate-hill, will be conveyed by way of the New and City-roads, in the same or less time than by the present route.

Ratepayers of the parishes through which the tramway will pass will be relieved of a portion of the tax for repairing the roads, as they will be saved the wear and tear of the omnibuses and horses which now pass over them. The wheels will be *entirely* removed from the road to the tramway, and the number of horses employed to carry the *same* number of passengers as at present travel will be reduced one-third.

The passage of the tramway omnibus on the smooth surface of the rail will be comparatively noiseless.—*Observer*, February 21, 1858.

The *Times* always first to advocate a reform, took up this question in earnest two years ago. The absolute necessity for some relief to the crowded thoroughfares is thus set forth :—

The question is, whether the traffic of the Metropolis is to remain in such a state as to absorb more time in getting from the Bank to the Treasury or

the Houses of Parliament than would be required to reach London from Reigate or Windsor? The proposition of the promoters of the street tramway is, to lay a line from Notting-hill-gate to the Bank, *via* Bayswater and the New-road, and thus to relieve Cheapside, Holborn, Fleet-street, &c., of the 1,592 omnibus loads of passengers to that district by which these thoroughfares are daily impeded. The tramway would consist simply of a small grooved rail let into the road, and would not create the slightest interference with the ordinary traffic, the system being similar to that which has for years been used successfully in the principal American cities. It is asserted that it would enable three times the number of passengers to be carried by the existing number of horses, thus affording an opportunity for a commodious construction of vehicles simultaneously with a vast reduction in fares, that it would reduce parochial rates by preventing wear and tear of the roads, and that, in a great measure, it will remove noise. That, in allowing such an experiment to be made, every precaution should be enforced to enable it to be done away with if it should prove objectionable, and to prevent anything like permanent pecuniary rights being obtained by a body of individuals over a portion of a highway which is equally the property of all, no one will dispute; but these are matters capable of easy adjustment. It is certain the present system of London locomotion cannot continue much longer. Each suggestion for a remedy is discountenanced. Underground lines, tubular lines, and every other contrivance that would promise a mitigation of the evil have one after the other been set aside, but the feeling that something must soon be done daily increases. If any one would take the trouble to calculate the annual money loss to our population from this monstrous anomaly, which causes their persons and goods to be blocked up daily in the midst of their most hurried avocations, while every faculty is taxed to accelerate their communications with America, Australia, or the Continent, it would be found that the sum we pay for the whole of our ocean mail service would not compare with it. Suppose a contrivance that might save but half an hour a-day even to only 100,000 of our population, and valuing their time but at sixpence per hour, the economy per annum would be little short of £500,000, and this without reckoning any advantage in the transmission of merchandise and the non-delay of horses. It is palpable, therefore, that millions are annually sacrificed through the want of some parliamentary and municipal recognition of the necessity of encouraging any feasible scheme that may lessen such gigantic national waste. Objections can, of course, be raised to everything in turn, but the mischief has now reached a point at which it is the business of those who pursue this course

to state the plans they are prepared to offer in substitution.—*Times*, February, 26, 1858.

The opinions of those on the spot, at the time the Tramway Bill was agitated, are worthy of being recorded, for the same arguments bear more or less on Sir Robert Ferguson's bill, now before Parliament :—

So far as we understand, (says the *Engineer*, March 5, 1858), Sir Benjamin has never expressed the precise reasons for his strenuous opposition to the Tramway Company's Bill going before a committee of the House. All we learn is, that he considers the proposition to lay down tramways in the public streets as a gross infringement on public rights, and we cannot but conclude, considering his general ability, that he must have received his instructions from his constituents. The vote of Friday last, however, has rendered his opposition comparatively harmless, and we sincerely trust that the new Chief Commissioner will look upon the scheme of facilitating the conveyance of the public through London with more favour than his predecessor. We hear, indeed, of one objection which was raised by Sir B. Hall to tramways, which was, that omnibuses running upon them could not turn out of the way so as to enable other vehicles to cross the line of their course. Surely such an objection was made in joke! Is it absolutely necessary that every butcher's cart should cross a street at the rate of ten miles an hour, and that at a moment when so doing would detain, perhaps, sixty persons, until the driver had gallantly cleared the tramway? We will admit that it is not unusual for the drivers of vehicles coming down Ludgate-hill to have suddenly to turn their horses half round when at the bottom, so as to allow a reckless youth from Farringdon Market to pursue an unchequered course over Blackfriar's Bridge. But is this a desirable state of things? Does Sir Benjamin Hall ever enjoy the friendly abuse which may be heard at this crossing several times during the day, that he so determinately opposes the introduction of a system calculated to remedy the evil?

Let us for a moment consider what change it is proposed to make in the traffic through the town, by the construction of tramways. It appears that every day as many as 1,312 journeys are made by omnibuses between Bayswater, Paddington, and the city, through Holborn, Newgate-street, and Cheapside, and that there are 280 journeys made daily between Bayswater and the city, by way of Fleet-street, Ludgate-hill, and Cheapside. This is equivalent to 1,592 omnibuses, carrying some 25,000 persons, through the most

crowded part of the city, and for what? To reach the Bank, which they might just as well do by a much more convenient route, that of the New-road and Moorgate-street, only that the distance is somewhat greater. Not a tithe of these 25,000 stop short of the Bank, or if they do so, they could by means of the "correspondence" system be set down at their destinations. The proposed tramways will practically shorten the New-road route between Bayswater and the city, and make it, in point of time, considerably less than the one now taken, and yet there are those who object, on the most frivolous grounds, to the introduction of the change. The gas and water companies think of their pipes, the sewers commissioners of their sewers, the telegraph companies of their wires, and it is not improbable that all of them will be represented in opposition to the Tramway Company's Bill. We trust, however, as all these several interests can be fairly dealt with without inconvenience or wrong being done them, that the good sense of those before whom the project comes will induce them to listen to no factious opposition; and supposing it be proved, which we believe it cannot be, that some temporary inconvenience may arise from the adoption of tramways, that the great advantages which they are calculated to confer upon the omnibus-travelling public will be constantly borne in mind.

Again, the *Engineer*, March 19, 1858, takes up the subject. This is the only way to bring this important matter before the public. The Fourth Estate can open the eyes of the incredulous when everything else fails:—

To those passing through London from one railway station to another, the importance of a ready means of traversing the streets is as great as to those living in them. How frequently does it happen that all one's calculations made with the most scrupulous care, and perhaps after some hours' battling with Bradshaw, are upset by the accidental crowding of the streets of London which may unexpectedly detain for an almost indefinite time, an express passenger who has crossed the greater part of the country at the rate of from forty to sixty miles an hour? Who has not occasionally spent as long in getting from the Paddington station to that of London-bridge, as he has taken to get from Didcot, or even from a more distant place? One great drawback to improving the means of transit through London has been undoubtedly the vast costliness of most of the plans which have from time to time been brought before the public, but no objection of this kind could be made to the last attempt to grapple with the evil of overcrowded streets.

The travel through London for two-thirds of the present omnibus fare, and at a speed of eight miles an hour instead of six, would be no small advantages to the omnibus-travelling public; and, setting aside the difficulty of duly controlling the Tramway Company, which might very easily have been surmounted, we are at a loss to understand what could reasonably stand in the way of the scheme being carried out. It appears to us that the proposition to lay tramways was just one of those reasonable measures capable of being realised by comparatively a very small outlay, which should have received the general support it deserved. Even supposing other undertakings perhaps more perfect, such as that of the Metropolitan Railway Company, were successfully completed, still the tramways must ever have been useful and convenient public improvements; or, if we look at the matter in the most unfavorable light, there would have been no difficulty in pulling the whole of the seemingly much-dreaded tramways up again, so soon as they were found to be in the way, and not necessary. That this could ever have actually been the case we deny, as the local traffic along the roads would always give plenty for omnibuses to do, especially if they ever be made tolerably roomy and be kept clean. The scheme has, as many of our readers will already have learned, been opposed by Sir B. Hall in his place in Parliament, and a motion has been agreed to postpone the reading of the Tramway Bill for six months, which is a civil way of throwing it out altogether. Where was our new Chief Commissioner of Works, that he did not use his influence in supporting a measure which was very popular, and which would, if common care and principles of straightforward dealing had been exercised on the part of the Government and the company, have resulted in one of the most reasonable undertakings ever brought before the public.

The last American advices say, that the cities of New Orleans, Quebec, and Montreal, are introducing Street Railways, and a bill has just been presented for a double rail down Pennsylvania Avenue, Washington.

The opposition to these roads in Boston was so great, that the whole enterprise would have been abandoned but for the perseverance of a few energetic men who determined that the system should have a fair trial.

Here is a statement of the CITY RAILROADS OF BOSTON AND ITS
SURROUNDINGS. Population 200,000.

CAMBRIDGE RAILROAD, BOSTON.

This railroad, constructed in the streets of Boston and Cambridge, from Bowdoin Square, in Boston, to Harvard Square, in Cambridge; and from thence to Mount Auburn Cemetery and the line between Cambridge and Watertown, where it connects with the Waltham and Watertown Railroad; with a branch from Harvard Square, in Cambridge, through North Avenue. The construction of the road was commenced September 1, 1855, and it was so far completed, March 26, 1856, that cars were run upon it on that day, on experimental trips, for the first time, by the Union Railway Company, to whom it has been leased.

This was the first street railway built in New England, and its originators experienced considerable difficulty in obtaining subscriptions to the stock and bonds of the Company, to pay for the construction of the road, owing to the fact that the experiment of a street railroad was one at that time untried, and its success doubted. Such great doubt was manifested as to the success of this road, that the Company could with difficulty secure a subscription to their stock and bonds the amount of about 43,000 dollars only. The contractor, therefore, agreed to receive this amount on account of his contract; the balance to be paid him in stock and bonds.

WALTHAM AND WATERTOWN RAILWAY, BOSTON.

This road was leased to the Union Railway Company, April 11, 1857, (which lease was confirmed by the stockholders, July 6, 1857), for the term of ten years; for the sum of fifteen hundred dollars per annum, from May, 1857, payable semi-annually on the first days of July and January—with the privilege of renewing the same for five years longer, at the same rate—they to keep the road in good repair at their own expense.

Statement of the UNION RAILWAY COMPANY, BOSTON,
For the year ending November 30th, 1850.

	Dols.	Cents.
Cost of construction and equipment	476,765	18
Total per centage of dividends at the rate of 10.58 per cent. per annum, leaving a surplus of 6,178 dols. 54 cents.		

Average number of horses to each car, 7.

Average cost of maintaining each car per day, including wear and tear, feed, salaries, depreciation of property, repairs of road, &c., 10 dols. 50 cents.

Average number of miles run by each car, 12,980 per annum.

Average number of passengers carried by each car, 50,120 per annum.

Average cost of carrying each passenger, 7½ cents.

Average cost of mile run, 29,460 cents.

Rate of speed, 8 miles per hour.

The total length of rail on this road is equal to that of a single track 9½ miles in length; the track is paved throughout.

THE METROPOLITAN RAILWAY COMPANY, BOSTON.

For the year ending November 30, 1858.

	Dols.	Cents.
Cost of construction and equipment	444,984	41
Total surplus for payment of dividends	66,540	77
Dividend of eight per cent. declared during the year ..	32,152	00
Present Surplus	34,388	77

Average number of horses to each car, 12.

Gross average cost of maintaining each car per day, including wear and tear, 13 dols. 76 cents.

Average number of miles run in one year by each car, 16,965.

Average number of passengers carried in each car in one year, 102,844.

Average cost of carrying each passenger, 4½ cents.

Average cost of mile run, 29½ cents.

Rate of speed, 5½ miles per hour.

The total length of rail on this road is equal to a single track of 12 miles; it is paved throughout.

MALDEN AND MELROSE RAILROAD, BOSTON,

For Eight months, ending November, 1858.

	Dols.	Cents
Cost of construction and equipment	242,548	31
Average number of horses to each car, 8.		
Average cost of maintaining each car per day, including wear and tear, repairs of road, &c., &c., 8 dols. 23 cents.		

Number of miles run by each car in 8 months, 4,215.

Average cost of carrying each passenger, $4\frac{1}{8}$ cents.

Average cost of mile run, 47 cents.

Rate of speed, 6 miles an hour.

The total length of rail on this road is equal to a single track of 12 miles; it is paved throughout.

MIDDLESEX RAILROAD.

This road is leased to the Malden and Melrose Company, who pay a semi-annual rental equal to eight per cent. per annum on each share of the capital stock of the Middlesex Railroad Company.

BROADWAY (HORSE) RAILROAD COMPANY, BOSTON.

This Company has had a location granted to it by the Mayor and Aldermen of the City of Boston, and the railroad is under contract for building. A portion of the same is completed, and in operation. The company has bought no real estate, nor any equipment, and no returns have yet been made.

THE DORCHESTER RAILWAY COMPANY.

This company has purchased the corporate property of the Dorchester Avenue Railroad Company, and leased the road; the lessees have run the cars and the line of coaches connected therewith, on their own account, paying to this Corporation a rent equal to eight per cent. per annum, on the amount of stock outstanding.

These statistics show that the business of street railways is of steadily increasing importance, and that the enterprise has been, so far, unquestionably successful. The investments have yielded large and regularly paid dividends, even on amounts of capital charged to construction, which was partly consumed in the purchase of imaginary omnibus rights, and other expenses, amounting in total to nearly treble the actual cost for which roads without grading or bridging can now be built.—*Easton's Practical Treatise on Street or Horse Power Railways.*

The following letter from OLIVER ELDRIDGE, Esq., late Commander of the Collins' steam-ship "Atlantic," speaks of the successful operation of Street Railways in Boston :—

Boston, December 30, 1859.

George Francis Train, Esq.,
Liverpool.

My Dear Sir,

Nothing would give me more pleasure than to send you the required statistics of our Street Railways for the present year, but I cannot get them in time for this mail. Those of last year you have already.

You may, however, be assured of one thing, our Passenger Railways are proving of the greatest public benefit to our citizens as well as profitable to the shareholders.

In addition to the roads connecting Boston with Dorchester, Roxbury, Brooklyn, Jamaica Plain, Cambridge, Charleston, Watertown, and Waltham, a charter has been granted by the City Government, to extend the Metropolitan from the corner of Boylston and Washington-streets, down Washington to Cornhill, and back again up Tremont-street to its previous terminus. The Cambridge Road, from Bowdoin Square, will probably be extended to join the Metropolitan in Tremont-street.

Also, another road is under contemplation to Chelsea, and the branches to these different roads in due time will connect several of the country villages.

The stock is pretty well distributed through all classes, and you can see by reference to our Stock Exchange, how much it is appreciated.

So successful have been these roads, that we are all astonished that such a public convenience should have been so long delayed.

I have lately returned from St. Louis, Chicago and Cincinnati, and found that the Street Railways already, was in full blast and as universally popular as in this city. To give you an idea of their popularity, I will mention that *Four and-a-half Millions of Passengers passed* over the Metropolitan Road last year. For public safety there is no such mode of conveyance known. An accident is so rare an occurrence, I remember but of two who were injured, and those through no fault of the Company.

During the summer months a water car goes over the track to lay the dust, a luxury never contemplated with the Omnibus.

The saving of taxes to the citizens on account of so much less wear and tear of Omnibuses is an important feature.

These roads are for the poor as well as the rich. The wealthy classes have their carriages and do not so much feel the want of them, but the working men find in this new system a comfort they never before realized.

The Jamaica Plain Road passes my own door, and having seen its construction from the first in the face of opposition, and now during the skating season seeing the cars crowded with old and young bound to Jamaica Pond for this winter recreation, many of which were among its opponents, I am convinced that the Street Railway has only to be introduced in your European cities to meet with universal satisfaction.

Yours very truly,

OLIVER ELDRIDGE.

Although the Americans have seized the idea and are practically demonstrating it, by introducing Street Railways into all their large cities as if it was a modern invention, I find, that there is nothing new after all in the system, except its application for passengers. A century ago tramways were used in England.

Cæsar's military roads from hill to hill, still mark the Roman's track. First, pack-horses transported the products of the land from place to place. Even a hundred years ago, this was the custom in Scotland; in fact, in some places in the Highlands, and in some of the hilly parts of Wales, it is the practice of to-day. Wooden sledges drawn by horses succeeded. Then wheel carriages,—afterwards wooden tramways, and last came, what the Egyptians used in the age of the pyramids, and the Chinese during the Christian era, canals; (the first in England was made in 1756). The Asiatic practice of laying down timber in bad roads most likely introduced the wooden rail. Down to the Elizabethan age, coals from Newcastle were taken in carts or on paniers to the sea.

Two tons were a good load for one horse on the wooden rail. This is now about the weight of a passenger car. In 1738, cast iron rails succeeded wood. In 1752 iron wheels were made, but the carriages were not linked together till 1763. Six tons of rails were made by the Colebrook Dale Company for their tramway, on the 13th of November of that year. In 1805, malleable rails were made at Wall-bottle Colliery, Newcastle-upon-Tyne. After horse-power, came steam.

Savery reduced to practice in 1663 the Marquis of Worcester's suggestion, in the "Century of Inventions." Newcomen made improvements in 1707. The cylinder and piston high-pressure engine came in 1720. These engines were used to pump water, but Dr. Robertson suggested to Watt, in 1759, the idea of making steam move wheel carriages. The "Surrey Iron Railway Company," in 1801, was the first railway act passed in the Kingdom. In the year that Wellington and Napoleon were born, 1769, Hornblower introduced his patent. In 1782, Murdoch made his model engine. Trevithick and Vivian, in 1802, reduced theory to practice, and obtained a patent for propelling by steam. The first trial was on common roads. Thousands saw the experiment where the Euston Square station now stands. Woolf made improvements in 1804, but George Stephenson, just before the battle of Waterloo, invented the steam-blast which was the life-blood of the steam-engine. Five hundred pounds premium was offered in April, 1829, by the Directors of the London and Manchester Railroad, for the best locomotive engine, to draw three times its own weight over a level plain ten miles an hour, weight not to exceed six tons, to cost not over five hundred and fifty pounds. October 6, 1829, was the first-trial day, and imagine the sensation produced by the engine running twenty-eight miles an hour! The last day of that year, the first railway in England was opened for passengers. On the 4th December, 1830, Stephenson's engine, the "Planet," took one hundred and thirty-five bales of cotton to Manchester. Thirty years later there were ten

thousand miles in England, and in America five thousand miles more of railway in active operation than is necessary to circumnavigate the globe.

This rapid glance from Roman days to our time, gives each stepping-stone from pack-horses to locomotives.

The Horse Railway is an English invention of years ago. The Americans, however, are first to apply it to any extent to cities.

It is a singular fact, that the first locomotive railway in Scotland (from Paisley to Renfrew, three miles) is now the first Horse Railway.

Captain DOUGLAS GALTON, R.E., says in his official report to Parliament, in 1857 :—

The encouragement of the use of rails on roads and streets, to facilitate the distribution of goods traffic as well as to accommodate local passenger traffic, would prove very useful in many towns where the streets are broad, instead of throwing every impediment in the way of thus extending the advantages of railways.

Mr. Scholefield, M.P., agreed with Captain Galton in commending them, as just the thing for large cities. Ask Mr. Cobden's opinion—he is a practical man and has seen a practical demonstration of their desirability.

Whether or not, the Street Railway, or some such relief is needed in the streets of London, I will let the *Times*, of Dec. 3, 1858, speak upon the subject—

The problem is simple and most pressing. It is, how are we to get about this huge, crowded, still increasing, still multiplying metropolis? There is a congestion at the vitals. Lungs, heart, and head are gorged, and cannot perform their functions. At any hour between ten and five, you are pretty sure to find some part of our main thoroughfare a solid pack of vehicles, unable to move one way or the other, and full of unfortunates who would give anything to reach their destination. They have to catch a train, or keep an appointment, or do a world of business in an hour. They have to see a lawyer, or a broker, or a friend who may just then be at home. They look at their watches, they crane out of the windows of cab or 'bus, they

mutter savagely, they remonstrate. All in vain. As they press towards the city there looms through the fog the dark arch of Temple-bar. Before them is an endless train of omnibuses, light carts, heavy vans, brewers' waggons, Hansoms, four-wheelers, trucks, some turned this way, some that, all indissolubly locked. Laocöon and his sons could not be more encoiled. At length there is a slight movement. The ice-field shifts. They advance a few yards, and then another dead lock. They are released only to be shunted up some siding. The pavement is up, and the busy stream of life has to perform a circuit in bye-streets. Ten times a-day is there such a lock at the Farringdon-street crossing, again on Ludgate-hill, again at the Poultry, again at the further end of Cornhill, in Fenchurch-street, and a dozen other narrow straits or confluent Mælstroms. Many a precious hour is lost and many a good temper permanently injured in these fatal defiles. There are few entreaties so little attended to as the *Siste Viator*, with which the past generation fondly besought us to linger over their virtues or their misfortunes. The command is here enforced with the rod of a magician. A dozen times a-day the traffic of this great city is turned to stone. At the hour of noon, the high tide of life and work, the provincial visitors in the Fleet-street "family hotel" become conscious of unwonted quiet. They can hear one another speak. They can even collect their thoughts and fancy themselves in their own parlours. After twenty minutes or so it suddenly occurs to them as rather strange that the streets should be empty at such an hour. They look out, and as far as eyes can see east and west is a triple row of vehicles of all sorts as dead still as the carriages at a coachmaker's. They look in amazement; but let them not look too long or allow their eyes to rest on a near object. The outsiders of a "bus" are not in the pleasantest mood for telegraphic communication at such a moment. * * *

Street railways, of which we have abundant examples in the United States and even on this side, are become a necessity in London. There is the long loaded, continuous train already. You see a dozen "buses," each carrying near thirty people, drawn by two horses, and managed by two men, toiling along, as near as movement will allow. Link them, place rails under the wheels, and put the power at front, instead of diffusing it between the several links and the problem is solved. The egg is set on end. The rail should be laid in the middle of the street with stations at the chief crossings, while the lighter traffic, and all that had to stop in the intervals would naturally take the side. Wherever the street is not wide enough for this purpose it ought to be widened. There might be difficulties, such as those from the cross traffic, but so there are now. It takes the continual exertions of an army of

policemen to keep order and prevent serious collisions. Nobody expects to cross so great a stream of traffic without some delay, and there need not be more even with street railways. There have been various proposals for subterranean railways and aerial railways ;—they can be tried should surface railways be found not to answer their purpose, which we do not expect. The simpler course is the most promising, and it has not yet been tried.

Great care should be taken in laying down the first rails in England so as to do away with all prejudice. Some of the early experiments in America were most expensive.

The want of science (says *The Treatise on Horse Railways*) and actual practice which has been exhibited in many of these undertakings, and the fruitless attempts at imitation, without a just comprehension of the original nature of the plan, have invariably resulted in injury to the road, a tax on the public, and a derangement of the finances of the company.

Under an ordinance of the City Council of Philadelphia, all iron rails laid in the streets must be of the same pattern and the gauge of track five feet two inches, the space between the wheels of ordinary vehicles. Under this arrangement the broad tramway of the rail provides a smooth iron surface for the wheels of carriages, waggons, drays, &c., and accomplishes the advantages of concentrating the travel, relieving the streets of the noise occasioned by the rattling of heavily-laden vehicles over the rough stones, economizing a heavy annual expense for repairing streets ; and by accommodating all classes of the community, the early prejudice and opposition are gradually being forgotten. * * * *

The improvements recently introduced in the construction of the railway overcome all the obstacles which formerly existed, and there is not an argument that can be urged against the system which cannot be satisfactorily combated by any one conversant with its practical operation. The increase of business caused by increased facilities for travelling, increases the number of *employés* required ; and the magnificent scale upon which these establishments may be conducted in Paris or London, would provide employment for thousands of officials, clerks, conductors, mechanics, drivers, overseers, stable-men, &c., and produce to the Government a revenue which will appear surprising and incredible.

The foregoing opinions of engineers, members of Parliament, and capitalists, endorsed by those journals who have made themselves acquainted with the practical utility of the City Passenger Railway, may prove of service to those whose prejudices may have arisen through want of knowledge of the subject.

The advantages of the Street Railway may be thus summed up :

1. Each railway car displaces two omnibuses and four horses, thus relieving the street of one of the main causes of the oft recurring lock-ups.
2. The wear and tear from these omnibuses being transferred to the rail, as well as that of many other vehicles that prefer the smooth surface of the iron to the uneven stone pavement, the rate-payers save a large per centage in taxes.
3. The Gas and Water Commissioners are not inconvenienced when making repairs, as the rails are laid on longitudinal sleepers which can be diverted in case of need ; and as these cars, as well as the carts and carriages that take the rail, move on a direct line, it is a self-constituted police system, saving confusion without expense to the public.
4. The cars move faster than the omnibus, and so gentle is the motion, the passenger can read his journal without difficulty.
5. The rails are so constructed, that no inconvenience arises at crossings from wrenching off carriage wheels, and as the improved rail is nearly flat, even with the surface, and some five inches wide, no grooves impede the general traffic, and the gauge admits all vehicles that prefer the track to the pavement.
6. The facility of getting in and out at each end of the car, and on each side, giving the passenger the choice of four places (see plate), together with the almost instantaneous stoppage by means of the patent brake, permits passengers to step in

or out when in motion, without danger, instanced by the fact, that nearly *thirty-five millions of passengers passed over the New York and Brooklyn roads last year, with only twelve accidents !*

7. In case of necessity, troops can be transported from one part of the city to the other, at ten miles an hour.
8. It is a special boon to the working-man who, often in America, saves threepence beer-money, to buy a ticket from his work in the city to his cottage in the suburbs.

In short, the Street Railway is as much a necessity as gas, sewerage, the steam rail, or the electric telegraph, and I challenge any one to refute the arguments in its favour herein advanced. Once introduced, you would miss the passenger-car as much as any great public benefit. The advantages of this system, over that of the present omnibuses, are, that you ride without jarring or jolting,—in less time,—with less confusion, less noise,—with less fear of accident,—less mud and dust, and with the additional luxury of more regularity,—more attention,—more comfort,—more room,—better light,—better ventilation, and with a greater facility of ingress and egress.

NOTE.—As practical evidence is preferable to theoretical explanation, I have had manufactured two model cars with sleepers and rails, which will show the principle in operation—one from Philadelphia, the other from New York—in order to give the style used in the respective cities, which are on exhibition at the office of JAMES SAMUEL, Esq., C.E., 26, Great George-street, Westminster, London, S.W., where statistics and every information required on the subject of Street Railways may be obtained by members of Parliament or others interested. Several capitalists of Boston, New York, and Philadelphia, who have been connected with the American Street Railways from the first, are interested

with the author of this pamphlet in introducing the system into Europe, and he is prepared, at his own expense, to lay down a rail in any street, where the concession will be granted, in order to give an ocular proof of its public utility.

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APPENDIX.

REPORT of the Chief Engineer of Montreal to the Chairman and Members of the Special Committee of the Corporation appointed to obtain Information in reference to the Construction and Operation of Street Railroads.

MONTREAL, 13th January, 1860.

To the Chairman and Members of the Special Committee of the Corporation appointed to obtain information in reference to the construction and operation of Street Railroads.

GENTLEMEN,—In accordance with your instructions, I have the honour to report having visited the cities of Boston, New York, and Philadelphia, in order to examine the advantages, construction, and working of horse railroad tracks there existing.

Boston, the first city visited, has within the city limits $14\frac{1}{2}$ miles of track, but the total length of horse railroads, terminating in the city, is $56\frac{1}{2}$ miles; the gauge is 4ft. $8\frac{1}{2}$ in., the steepest gradient $5\frac{3}{8}$ feet per 100 feet; the sharpest curve is of 33 feet radius. The cars are generally 16 feet long, or 22 feet from out to out of platforms, and 7 feet wide in the clear, 12 feet high from rail to top of roof; seat 22 passengers, but can carry 60, and are drawn by two horses. There are also a few single horse cars in use here, but they are not so well liked as the double, nor are they (although they require but one man to drive and act as conductor,) found to be so profitable to the companies as the double horse cars. The body of a single horse car revolves on a pivot, so that the end of a trip the horse does not require to be unhitched.

The following is the width of some of the streets in Boston in which rails are laid :—

Boylston-street,	24 feet	between kerbstones,	has a single track in centre of street.
Cambridge-st.,	20	„ „	at upper end has a single track laid at from 4 to 8 feet from kerbstones in some places, and in others is in centre of street.
Tremont-street,	33	„ „	has a double track, one side of which is about 3 feet from kerbstone

I have seen a one-horse car, filled with passengers, come up Cambridge Street at a fair trot on a grade of $5\frac{3}{10}$ feet per 100 feet.

The number of horses required per day for each two-horse car is six (6), each pair of horses running 18 miles, and each car 54 miles; each two-horse car requires one conductor and one driver; the wages paid them are 2 dols. and 1 dol. 50 cents. per day.

This year quite a number of streets are to have rails laid down in them, amongst others Cornhill, through which there is a great traffic; it is very steep, and the width between kerbstones is only 23 feet.

The rate charged on any road is 5 cents, but to connect with another road the fare is 6 cents, in which case the two companies divide the fare.

From all I could learn, the parties here who, at the commencement of horse railroads three years ago, were most opposed to them, are now the most strenuous advocates for them.

There are various kinds of superstructure used here, of which I annex drawings; but none of them that I have seen come up, in my opinion, to that marked No. 1, on drawing, or the Philadelphia plan; the new roads to be laid here will be on that plan; and so soon as the old rails here are used up the tracks will be re-laid on it. Some experiments have been made on cast-iron rails here, but cast-iron, except on curves, has proved a failure.

The companies keep the streets through which they run in repair for 4 ft. 6 in. from each side of centre of track; but the track is laid without regard to lines of water or gas-pipes, or to sewers.

New York (the next city examined,) began laying track in 1852, and has now about 30 miles of single track in the city; but as the lines here are pretty much the same as in Boston, I will only allude to the principal and pioneer of horse railroads here, viz., the 3rd Avenue. Its length is 8 miles, gauge 4 ft. 8½ in.; their charter is perpetual. They have 800 horses and 90 cars; run a car every minute during some hours of the day, and every minute and a-half or two minutes during the remainder; at night they run a car every twenty minutes. Their fare is 5 cents, or to Haarlem 6 cents; 8 horses are required for each car per day, each pair making one trip. The track, which is partly paved and partly macadamised, is kept in repair by the company two feet outside the rails. On this road they have tried some cast-iron paving, but it has proved a failure, the horses slipping too much on it unless it is kept well sanded. This season it is understood a double track will be laid down in Broadway.

In Philadelphia, where City Railroads have been carried out to a greater extent than in any other city, I was under great obligations to Messrs. Trantome, Morris, Palles, Kneas, and other eminent engineers, for much valuable information on, not only street railroads, but on sewerage and other professional subjects; to Mr. Palles and Mr. Kneas especially who have been engineers for most of the roads there, I am under obligations for drawings, notes, estimates, &c.

In Philadelphia, since 1856, there has been laid 90 miles of track for horse railroads; gauge generally 5 ft. 2 in. The charters have been obtained from the state, subject to confirmation by the corporation, whose engineer directs the laying out. The corporation do not own the streets between the kerbstones; that portion of the streets being the property of the state.

The width of Chesnut and Walnut-streets, the principal business streets, is 26 feet between kerbstones; in each of these streets a single track is laid, the cars running down Chesnut, cross at its lower end to Walnut, pass up Walnut to near its upper end, and cross to Chesnut street. These two streets run parallel, and are about 600 feet apart, the length of track in them is 5 miles.

In Market-street, which is 60 feet between kerbstones there are four tracks.

The steepest grade within the city limits is 1 in 20, but on a branch of the West Philadelphia Road there is a grade of 1 in 10; on this grade additional horses are required. At one time the sharpest curve believed to be practicable was of 60 feet radius; now, with improved rails, 33 feet is found ample.

The cars here are all drawn by two horses; I append a drawing of one

similar to those in use on the Chesnut and Walnut-street and other lines. All the roads (with the exception of two which are in the hands of the Sheriff through mismanagement) appear to be doing a good business. One road, the Green and Coates-streets, on 26th December last, carried 15,000 passengers, and on that day the West Philadelphia Road, 10½ miles long, carried about the same number, but that day being kept as a holiday there were more passengers carried than usual.

I append a table of the number of miles of track, horses, cars, &c., belonging to the different companies here, so far as I could get reliable information. I also visited most of the depôts, stables, &c. In one stable of the Southwark and Frankfort Company, there were 400 horses; in another, of the 5th and 6th Streets' Company, there were about the same number.

In Philadelphia, I believe, that nearly all the various plans of rails out have been tried. The grooved rail, as used in New York, marked No. 2 on plan has been abandoned, and all engineers whom I have met agree in saying that the rail marked No. 4 in drawing is the best out for street railroad purposes. I would recommend, however, that the rise on it be not more than $\frac{1}{4}$ of an inch, which I am certain will be found ample and will render it easier for waggons, &c. (which are invariably driven on the track when possible) to get out of the way of the cars. This rail is 5 in. wide; its broad flange for the wheels of carts, waggons, &c., has the advantage that it concentrates the travel, relieves the streets from the noise occasioned by heavily laden vehicles rolling over a paved or macadamised road, and allows of a much greater weight being put on common vehicles.

You will observe from the drawings I annex, that most of the roads in Boston, New York, and Philadelphia are built on a rather expensive plan; I proposed to Mr. Palles a plan which I tried some years ago on a steam railroad, and he having thought favourably of it, has agreed to try it this season on some roads he is about to build in Philadelphia; by it the track is much more easily laid, and costs less in the first place, while it is more easily kept in repair. It is marked No. 1A on drawing.

As to the advantages of street railroads, I think this rather a matter for you or the parties who may undertake their construction, to consider; still, having seen Chesnut and Walnut-streets, in Philadelphia, in 1858, before tracks were laid down in them, and having seen them again last month, when the railroads were in operation, I think I may give my opinion as to railroads in these streets being an obstruction to traffic or otherwise. The above streets, although the principals in a city of 660,000 inhabitants, are only 26 feet wide between the kerbstones, or some three or four feet wider than our

Notre Dame-street in its narrowest part. In Chesnut-street in 1858, during certain hours of the day it was dangerous to cross it from the number of carriages, omnibuses, &c., passing; now it is safe to cross at any time, the street is much quieter (the cars running along with little noise), and a foot passenger can cross without much risk of being run over by one of the many omnibuses that used to run on that street.

In Philadelphia, since street railroads have got fairly into operation, the value of property in the suburbs has increased from 30 to 50 per cent., while the value of that in the centre or business part of the city has not decreased; and instead of the value of horses and their feed having decreased, on the contrary, they have increased.

As to running cars in winter, I would only say that in Boston the corporation, when they consider the snow deep enough, oblige the companies to run sleighs. In New York and Philadelphia the company use a snow-plough and a salter to keep their tracks clear. I may mention, that while examining improvements in locomotion in Philadelphia, Mr. Dodsworth and I saw a new car about being fitted up with an engine to run on street railroads without noise or smoke of any consequence; the car was being built by Messrs. Kimball and Gorton, and the engine by Messrs. M. W. Baldwin and Co.; it was to be ready about 1st February, and would seat 40 passengers; I annex elevation of same. A caloric engine is being built in New York for a street railroad company there; but I was not aware of the fact till too late to examine it.

While in Philadelphia, some engineers proposed a new plan of laying rails; they proposed reversing the rail, the flange to be on the inside; the benefit from this would be that water would run off more easily; but I would be afraid of the rails spreading, in which case there would be more friction, tear and wear, and danger of accidents. See drawing No. 5 for this idea.

I very much regret that since I returned from Philadelphia I have been so much occupied on pressing business, both in town and country, that I have not been able to devote so much time as I would wish to this report; in fact I have not had time to copy it before your meeting to-night; but I will be happy to communicate what further information you require, when you wish it.—I have the honor to be, Gentlemen, Your very obedient Servant,

(Signed)

P. MAQUISTEN,
Civil Engineer, Montreal.

True Copy of my Report of this date, 13th January, 1860,

P. MAQUISTEN.

From the *Birkenhead Advertiser*, April 14, 1860.

THE HORSE RAILWAY LINE.—BIRKENHEAD.

At an adjourned meeting of the Commissioners on Tuesday next, this important subject is to be further discussed, and we hope it will then be settled to proceed with the arrangement, by which we feel convinced the interests of this township and the value of property will be materially benefited. When the matter was first brought forward, the novelty of the proposition was rather startling, and although strongly impressed with its advantages, we had not made ourselves acquainted with the details as to carrying out the principle efficiently. We have since perused a pamphlet by Mr. Train, and been favoured with some valuable information given to one of the Commissioners, by a gentleman fully competent to afford it, which we leave to speak for itself, merely premising that if we are to judge of the future by the past, Mr Braithwaite Poole's estimate of the time within which such an improvement of local omnibus traffic in connection with the ferry can be established, is rather wide of the mark as regards this locality. We can scarcely doubt the Commissioners will embrace the opportunity afforded by Mr. Train, of trying this practical experiment, which, coupled with the improved ferry traffic, now under the consideration of the legislature, will effectually bridge over the Mersey, and unite in one common bond its two shores. We again call the attention of our readers to the following correspondence, and to additional evidence which will be afforded them at the Commissioners' meeting upon the benefits of this great social desideratum:—

“Devonshire-road, Claughton, 4th April, 1860.

My Dear Sir—As I understand you have recently returned from a trip to the United States of America and Canada, and as you have devoted so much of your time to railway matters in this kingdom, and on the Continent of Europe; I infer that your attention would be directed to this description of traffic in America; I therefore ask your opinion on the following subject. We have an idea of allowing Mr. Train to lay down a horse line, to run from Woodside Ferry to Claughton and Oxtou, and as we have a considerable incline, I am afraid some obstacle may be thrown in the way of such enterprise.

I shall be glad if you will give me your ideas in a condensed form, as to the practicability of this undertaking generally, and how you found them

work in America. Knowing your desire to promote the interest of this side of the water, I shall offer no apology for thus troubling you—I am, my dear sir, yours respectfully,

H. WHITTLE."

Braithwaite Poole, Esq.

"Liverpool, 7th April, 1860.

My Dear Sir,—In reply to your note of the 4th instant, I can fully confirm the statement made by Mr. G. F. Train concerning the Street Railways of New York, Philadelphia, Boston, Chicago, St. Louis, Cincinnati, &c., as I have seen and carefully examined every one of them.

The system is admirable, and the operation of it a great blessing conferred upon the community; it may be easily and safely introduced into any city or town in England or in Europe.

In Philadelphia, I was told, a few months ago, there were in full operation 100 miles of street railways, in Boston 50 miles, in New York 45 miles, including Brooklyn, the Birkenhead of New York.

The rails are grooved, and countersunk in longitudinal sleepers, level with the pavement of the streets; so that instead of being any impediment, the rails afford the greatest facility to traffic of every description. The gauge is generally 4ft. 8½in., but it ranges up to 5ft. 6in. in some cities.

But instead of horses, locomotive engines are used to draw trains of cars with passengers and freight through the streets of cities in the United States and Canada, with perfect safety: for instance, in Market-street, Philadelphia, (which may be compared with Holborn, or Oxford-street, in London, or the 4th Avenue, New York, or the Esplanade, in Toronto,) which seems the whole length of the city, locomotive engines draw the trains on the level across every street running at right angles or otherwise, and the passengers with perfect safety and comfort.

The speed on the horse railways is only five to six miles an hour (stoppages included), but it may be accelerated whenever or wherever required, except when ascending steep hills.

At the foot of steep inclines, as in Brooklyn and other places, an extra horse is hooked on to each ascending car without stopping it; and the brakes are made sufficiently powerful to regulate the descent.

The cars are beautiful vehicles, superior to any of the kind seen in any European city, and the ordinary fare charged is 5 cents—2½d. only; they are fitted with flanged wheels and axles radiating to the curves, enabling them to pass easily round the corners of streets where required.

In fact, our Brother Jonathan is highly intelligent, ingenious, industrious, temperate, liberal, and extremely hospitable. He soars a long way a-head of his grandfather in England; he builds national schools for his children, instead of gaols; and he is consistently religious, inasmuch as he closes all public houses and all horse railways on Sundays.

With especial regard to the district you name, Woodside Ferry to Oxton and Claughton, there does not exist any difficulty, but on the contrary every facility for the construction of horse railways: fine open streets and roads, well ballasted and paved; the inhabitants aspiring, and the population rapidly increasing. The position is evidently a favorable one for carrying out this contemplated scheme.

As respects the financial part of the question, I presume you are sufficiently well informed; therefore to give you my opinion briefly, it is simply this—that, if Liverpool and Birkenhead were situated in America instead of in England, there would be horse railways of 4ft. 8½in. gauge constructed with elegant carriages running upon them, conveying passengers every five minutes of the day direct, and without change of vehicle, across the river, between West Derby and Claughton, the Old Swan and Oxton, within one month from this date.—I am, dear sir, yours truly,

BRAITHWAITE POOLE."

To Henry Whittle, Esq.

From the *Birkenhead Times*, April 21, 1860.

BIRKENHEAD COMMISSIONERS.

On Tuesday morning an adjourned and special meeting of this Board was held at the Public Offices, Hamilton Square, for the purpose of taking into consideration the propriety of adopting the American system of Street Railways in this town, brought under their notice by the proposal of Mr. G. F. Train, to construct such lines at his own expense, from the Woodside Ferry to Claughton and Oxton. Mr. John Laird occupied the chair. The other members present were—Messrs. Beazley, Rae, Harrison, Bradley, Walker, Willoughby, Baylis, Keightley, Peck, Whittle, Cook, Gough, and Aspinall.

The minutes of the preceding meeting being read and confirmed, the following report on the subject of the introduction of Street Railways here, by Mr. Mills, the surveyor, was read:—

STREET RAILWAYS.

Surveyor's Office, April 12, 1860.

"According to the instructions of the general board meeting of the 3rd inst., I beg to report to the Road and Improvement Committee on the proposal of Mr. G. F. Train to introduce Street Railways as an improved mode of public conveyance within the townships of Birkenhead and Claughton.

"The committee must be aware that an important element in preparing a full report on this subject, namely, the practical operation of the system, is wanting in this instance, there being no Street Railway of the kind proposed in operation in this country. I have read the observations on those railways by Mr. Train, addressed to the president of the Board of Trade, London, and as this pamphlet has been circulated amongst the Commissioners, and several notices have appeared in the public papers, the Birkenhead Commissioners will be as well acquainted as myself with the opinions of engineers and others therein quoted.

"I have also seen a copy of the 'Report to the Chairman and Members of the Special Committee of the Corporation of the City of Montreal appointed to obtain information in reference to the construction and operation of Street Railroads,' by the Engineer of the Corporation, Mr. P. Maquisten, who visited the cities of Boston, New York, and Philadelphia, for the purpose of obtaining information. After describing the number and extent of the Street Railways in operation, their mode of construction and working, he gives an opinion that those railways are not an obstruction to traffic, but otherwise. The Report states that in Philadelphia, since Street Railways have been fairly in operation, the value of property has increased from 30 to 50 per cent., whilst the value of property in the centre or business part of the city has not decreased. The advantages of the Street Railway, according to the views of the promoters of the system, are briefly summed up in page 46 of Mr. Train's pamphlet.

"Applying the facts which have been stated in Mr. Maquisten's report and Mr. Train's pamphlet to the proposed introduction of those railways along some of the principal thoroughfares in Birkenhead, I do not see any reason for opposing the plan, but should rather recommend it as deserving the favorable consideration of the Commissioners. Moreover, the town itself is laid out in many respects advantageously for a trial of the system. The principal streets are of good width, and of moderate inclination, and many of them are not traversed by any public conveyance. Whatever may be the result of its

application here, it is certainly the recognised means of transit, and does confer a great boon in locomotion to the residents of the largest cities in the United States. There will be necessarily matters of detail connected with the laying down of the rails in the streets, on which at the present time I presume the Board do not require any information, nor indeed could a report be given on those points without having the plans of construction. I may state generally that I approve of one line of way in the centre of the street, where the width between the rails is sufficient to give an up and down road on each side of the track for the other traffic. By this arrangement vehicles standing at a shop or house door need not move on the passing of the railway car. The mode of passing standing vehicles by moving ones would be for the latter in passing to take the railway track, and there would be no difficulty in this from the slight depth of flange of the improved rail.

“As the sewers of this township are laid out, a line along the centre of the street would be over the sewer, and the present mode of cleansing by opening at each man hole might have to be somewhat modified, by opening only in the side streets, but these side entrances would, as the town becomes built up, be as near together or nearer than the distance at present between the man holes. I apprehend, therefore, no practical difficulty in the maintenance of the sewers, whilst by keeping the track in the centre of the street, the gas and water mains will not in any way be interfered with.

“If the railway be laid down in streets of less width than would admit of a centre railway, and one at each side, it might be desirable to limit the track to be worked, to be worked but one way only.

“I need not enter into the money part of the proposed enterprise, as that under Mr. Train's letter, is not at this time a question for the Commissioners.

“The American statements are favorable as to the commercial success of the undertaking, but then the revenue is earned in cities of large population and great trade.

“The owner of a street railway, whether a company or an individual, contracts to maintain that part of the street occupied by the track, and a certain width also on each side of the rails; to that extent, therefore, which may be taken to average in most cases one-third of the breadth of roadway, the cost of maintenance would be saved to the ratepayers. As the proposal the Board have under consideration is only by way of experiment, no great stress may be laid upon the point as favorable to the ratepayers; but supposing the mode of transit to answer, and to become largely extended, the saving of ex-

penditure upon the roadways might amount to a considerable sum. In case the lines of railway have to be removed from the streets from any cause, the owners must undertake not only to restore the roadway, but to maintain it until it has become thoroughly consolidated.

“There is a point to which I respectfully beg the committee's consideration in dealing with Mr. Train's proposals. If the Commissioners cannot, as it has been stated, grant an exclusive right to a track laid down for a particular purpose in a street which is recognised as a public highway, it would seem hard upon an enterprising projector if he could not to some extent be protected from annoyance in the transit of a public conveyance along such track. A heavy cart or other vehicle moving at a slower pace than the railway car, and proceeding the same direction, might occupy the track, and as the latter from its construction cannot move from the line, an impediment to the public transit would be created, and this might be persevered in from disposition to annoy, if there were no obligation on the users of the track to make way for the carriages of the owners. The rule of the road would not apply if the track were laid on one side of the street.

EDWARD MILLS.”

A memorial was also read from sixty-seven of the inhabitants of Grange-lane and Cloughton-road, objecting to the proposed street railways on the ground that they would be attended with injurious consequences to business and pedestrians in the locality.

They also expressed a hope that the Board would give them an opportunity of giving effect to their objection by evidence.

Mr. Harrison suggested that the Board should not come to any hasty decision on the subject. He thought that the best way of dealing with it would be to appoint at the present meeting a committee to investigate it, with powers to see Mr. Train, and to take evidence, and then make a report to the general Board, when the adoption or non-adoption of the scheme would be in the hands of the members. He believed that it was an important matter, and if they could thereby make any improvement in any part of the town to facilitate transit to the outskirts of the neighbourhood, which would increase the value of property, it was certainly well worthy of every consideration. He thought, however, the system should be adopted without undue inconvenience, and there were districts where he feared it would tend to have that effect. The fact was, there were so many details that it was not possible for the Board to

decide at that meeting ; therefore he would propose that Messrs. Laird, Hinde, Rae, and himself, be appointed as a committee to investigate and take evidence on the subject, learn the terms of Mr. Train, where he intended to construct these rails, and furnish a report, a copy to be forwarded to each member of the Board in six days.

Mr. McGill seconded the motion.

The Chairman thought the committee should be invested with full powers to make arrangements with Mr. Train, subject to the approval of the Board.

Mr. Gough thought the matter should be placed in the hands of the Road and Improvement Committee, who were just the men to deal with such a subject. He objected to Mr. Rae being on the proposed committee, who was not a practical man. What did he know about it? He considered that he himself ought to have been named on the committee, as a practical person. Mr. Rae was on all the committees.

The Chairman requested Mr. Gough to confine his remarks to the question. He did not think it was right to make personal observations. (Hear.)

Mr. Harrison begged to say that he never consulted Mr. Rae on the matter, nor did Mr. Rae know of his intention. He would be happy to see Mr. Gough on the committee, as no doubt he had considerable practical knowledge.

Mr. Aspinall moved that Mr. Whittle be a member of the committee.

Mr. Whittle expressed his willingness to assist the committee in their investigation, but he could not act as a member, because he would be out of town.

Mr. Harrison disapproved of a numerous committee.

Dr. Baylis thought that the mode of doing business suggested by Mr. Harrison in his motion, if determined on, was trifling with the subject. The present was an adjourned meeting to take into consideration and decide on the question of the introduction of the street railroad system in this town, and now it was proposed to appoint a committee. He submitted that it would be better for the Board to go into the question at once. They were more than double the number of that suggested committee, and they had the surveyor's report before them. There could not be any serious objection stated to the adoption of the system of street railroads here, on the score of expenditure, for Mr. Train was willing to lay them down himself, and did not ask for any monopoly. It seemed to him impossible that it should pay him, but that was a personal question. He did not however think that Mr.

Train regarded it in that light. He did not want to make it pay here, but to demonstrate to other and more populous and important towns the immense advantages of the system. He was afraid that they risked much in delaying, for Mr. Train might make the same offer to other places which would accept it, and so the expense of its adoption with them be greatly increased. The proposal to put the investigation of the matter in a few hands would result in only losing time and trifling with the subject, and therefore, they should proceed with it at once. Those gentlemen who had opposed it would be as ignorant of the question that day fortnight, as they were at present. The advantages of the system could not be doubted, and the only objection was that some private interests would be interfered with. They had as guarantees of those advantages the opinions on record as to its operation in America, where it had been adopted by the principal cities, and they had also on record that it was opposed in almost every instance by the majority of the inhabitants and shopkeepers, and those parties had been the first to recognise its benefits when in operation. To shopkeepers it would be a palpable advantage, for there would be as much traffic passing their doors, with less noise and none of that dust which was so injurious in its effect to goods. There was also another thing, and that was the facilitating of transit to the outskirts of the town, by which means greater numbers would be induced to live on this side of the water. Starting from the Woodside Ferry, rails might be laid for short distances at first, say to Oxton and Claughton, and when thoroughly tested, might then be extended to Hoylake, New Brighton, Seacombe, and in the contrary direction, to Rock Ferry as far as Eastham. For Birkenhead there could not be a better thing. It would also benefit the Birkenhead Market if the system was carried into effect, for those parties who crossed the river to make their purchases in Liverpool, would as a matter of course come down by these omnibuses to Market, by which they might also convey back any luggage. And thus Birkenhead would become the centre of this side of the water.

The Chairman reminded Dr. Baylis that the surveyor's report was before the Board, and that any remarks on the general question were out of order, unless he meant to move its adoption.

Dr. Baylis had no objection.

Mr. Keightley then formally moved and Dr. Baylis seconded.

The Chairman said that individually he had a very strong opinion in favour of the system, but he thought a committee should be formed—he did not say Mr. Harrison's, but any one they liked—to consider the whole subject, and settle the details of an arrangement with Mr. Train.

Mr. Harrison would be an advocate for their adoption here. He had seen and given very great attention to its working. He had seen the advantages as well as its difficulties. This principal source of information, however, had been published in Mr. Train's pamphlet, in which he found that Sir Benjamin Hall was attacked, one of the most shrewd men in England; and that very fact tended to raise doubts in his mind if Sir Benjamin Hall was not correct after all. But he had not received any information as to how it would be constructed or how conducted, and he did not know that any such information had been placed before the Board. In reference to the surveyor's report, he considered that each of the members ought to have had a copy in his hands last Friday, when it came before them, and not be called upon to decide at once. For his part he would agree to nothing that sanctioned the laying down of street railways, until he knew the dimensions of the vehicles. He would support the adoption of the system where practicable.

Mr. Bradley said it was proposed at the last meeting that it should be referred to the Road and Improvement Committee, but it was agreed that the Board should form itself into a committee, and adjourn for a fortnight in order that the members might obtain the requisite information. He complained that after this time had been allowed gentleman should come and tell them that they had not received any information. He could not see for his life why the matter should not be settled at once. He would say that he did not think that any person could give him any more information on the subject than he already possessed, for he had as much as he was capable of understanding, without experience of the working of the system.

Mr. Aspinall thought that the Board might approve the principle, and arrange the details afterwards.

The Chairman said that the principle would be approved of if the surveyor's report were adopted by the Board. But he considered that it would be unwise to adopt Mr. Train's scheme without the details. The Board ought not to be committed by any act to adopt it without seeing security that he could carry out his agreement. To do so, would, he considered, be a suicidal act for the interests of the townships. He believed the majority of the members were in favour of the scheme, which would be of great importance as connected with the ferry. If Mr. Train were prepared to give grounds, he would certainly support him. He did not see, however, how they at present could go further than adopt the surveyor's report.

Mr. Bradley conceived that all the necessary steps had been taken.

The Chairman thought that they should deal with the question as if it were a transaction connected with their own business, which they were bound to do in the interests of the public; and he was sure that no agreement would be come to in ignorance of the details. He suggested that some gentlemen from the Ferry Committee should be added to the Road and Improvement Committee with the view of settling the matter.

The report having been adopted, some further discussion took place, when it was ultimately resolved that the Ferry Committee and the Road Improvement Committee, with the addition of Mr. McGill should be formed into a joint special committee to inquire into details, and make arrangements with Mr. Train, and report to the Board as early as possible.

Before the Board separated, Mr. G. F. Train was requested to submit his model of the American railway car, which was examined with interest by the members, who expressed a high opinion of its construction.

Since the above meeting was held, a letter has been addressed by Mr. Train to the Chairman of the Improvement Committee, and contains some important modifications of his proposal. We insert it below:

“TO THE CHAIRMAN OF THE IMPROVEMENT COMMITTEE.

5, Temple-place, Liverpool, 17th April, 1860.

“Sir,—Some of the commissioners and inhabitants of your township having objected to the proposed street railway through Grange-lane, I beg to say that I am quite disposed to alter the route as may be suggested by your surveyor, and that such alteration, as far as respects the route to and from Claughton and Oxtun, is now under consideration, and will be decided upon by Tuesday next, 24th instant.

“Meantime, I hereby ask permission to make a track from Woodside Ferry to and from Birkenhead Park, as marked in red ink upon the map herewith, and as described on the annexed leaf.—I am, sir, your most obedient servant,

“GEORGE FRANCIS TRAIN.”

ANNEXED LEAF.

“Route—To commence at Woodside Ferry, and proceed along the river bank or dock road to Argyle-street, up this street to Conway-street, thence to entrance of Birkenhead Park, returning by a second track on Conway-street to Argyle-street, thence by a single track along Market-place to Chester-street, and thence to the Ferry.



"The track and one foot each side to be kept in repair by me.

"Cars to be similar to model, or with such alteration as may be deemed expedient.

"Time of running from 8 a.m. to 10 p.m., and as often as public accommodation may demand.

"Fare not to exceed 3d. per journey each way.

"The Commissioners to have the right of purchasing the track, stock, &c., at an equitable valuation, within such time and upon such terms as may be mutually agreed upon.

"Security—Observing in the published accounts of the proceedings of commissioners some remarks in reference to security, I undertake to satisfy you upon this point at once, and solicit your suggestion.

"Agreement—All the foregoing can be embodied in an agreement to be prepared by your law-clerk and my solicitors, Messrs. Fletcher and Hull.

"GEORGE FRANCIS TRAIN."

EXTRACT from REPORT of Mr. R. A. GRAY, C.E., to the Grand Jury,
County Dublin, Easter Term, 1860.

"The attention of the surveyors having been called at the last County-at-large Sessions to a bill before Parliament, "To facilitate internal communication in Ireland by means of tramways or tramroads." Our opinions were solicited as to what effect the provisions of the bill would produce (if enacted) upon the existing thoroughfares, and the interests of those concerned in their construction, maintenance, and use. Our ideas were given on each clause of the bill *seriatim*, and some observations in addition upon the working of the system in the United States, where it is extensively in use, may be considered desirable; and I may state some facts respecting the subject—a knowledge of which I acquired during my professional occupation in that country. The tramways are there almost exclusively confined to the cities and large towns, mechanical traction being found cheaper and more suitable on the long lines of communication through the country, the great facility for starting and stopping vehicles drawn by horse power on rails gives such a decided advantage to that mode of conveyance through populous towns that it was very extensively adopted, and continues to increase rapidly.

"I observed, that in addition to the great advantages the proprietors have in being able to move a comparatively very great weight at a good speed under complete control, that the public enjoyed the benefit of ample accommodation in the vehicles, were conveyed at very cheap rates, were taken up or laid down wherever they desired along the line, were carried without noise or jolting, and as compared with any other means of locomotion were particularly free from accident.

"The rails for these conveyances are of a peculiar construction, so contrived as not to interfere with the ordinary traffic of the streets they traverse, but, on the contrary, afford a surface which is invariably taken advantage of by drivers going in the direction of the tramways. The annexed section represents the rail in use on 6th Avenue, New York, a crowded and fashionable thoroughfare; it is a heavy rail, and one that does not interrupt the crossing in any direction, or at any angle of ordinary vehicles, although there is a double track through the street. There are, however, other sections quite as free from objection, as far as interference with the street surface is concerned. The 6th Avenue establishment consists of 4 miles of double track, laid with a 7½lbs rail; the rolling stock consists of 70 carriages of about three tons weight each, worked by 420 horses and mules; the fares for the entire length being 2½d. for adults, and 1½d. for children. Notwithstanding, the owners realize 10 per cent; the number of passengers travelling on this road, which may be taken as an average per annum, is 5½ millions; and the number conveys an advantage the rest of the street derives from such a multitude being thus carried instead of travelling on ordinary modes of conveyance, and adding so much to the wear and tear of its surface. The official statistics published in 1858, alluding to 5 lines of tramways in New York, give the following results, viz.:—

2nd Avenue,	8 miles of single track,	carried 4,504,645 passengers.	No accident.
3rd ,, 6½ ,,	double track, ,,	7,045,462 ,,	Six injured.
6th ,, 4 ,,	,, ,,	5,612,357 ,,	No accident
8th ,, 5 ,,	,, ,,	6,768,203 ,,	1 injured.
Brooklyn 21 ,,	,, ,,	7,705,830 ,,	5 injured.

Thus the safety of the system to travellers is exemplified by the fact that of 84 millions who travelled during the year, only 12 were injured.

"In Philadelphia, where I spent the winter of the year before I became your surveyor, there is a population of half-a-million, and it is now traversed by 164 miles of tramways. Of the great advantage of these ways public

opinion must be strongly impressed, when the inhabitants of such a town, consisting in great part of Quakers, proverbial for prudence and steady calculation, have adopted them to such an extent in the short time of little more than four years.

"At the beginning of this year there were in Boston 56, New York and Brooklyn 50, Baltimore 50, St. Louis 24, and a proportionate extent in Cincinnati, Chicago, Milwaukee, and almost every large town in the Union.

"I have observed that the enormous amount of traffic diverted by these tramways from the ordinary ways has produced upon the latter a proportionate effect in relieving them of so much wear and tear due to the quantity of work performed by the former, and feel that this observation will be very applicable to the circumstances of the principal thoroughfares in this country, in the event of tramways being introduced upon them, or in their direction, particularly as the bill contains provisions for enabling farmers and others who now use the ordinary roads extensively for the transport of agricultural and city produce to use their own conveyances on the tramways.

"I may add that the gradients and curves which are quite practicable in the formation of these ways are such that in the rural districts no unsightly embankments or deep cuttings, with their consequent waste of land need be apprehended, and that in most cases the grades and curves of the county roads are nearly sufficient.

(Signed) R. A. GRAY."

17th April, 1860.

The following Letter has reference to the Irish Tramway Bill :

"City of Dublin and Suburbs' Tramway Company,
May 18, 1860.

"George Francis Train, Esq.,

"Dear Sir,—It is to be regretted that the Select Committee on the Irish Tramway Bill did not take evidence, as very valuable information could have been obtained from Messrs. Scholefield, Gregory, Cobden, Caird, Milnes, and other members who visited the United States lately, as well as Mr. Palles, C.E., of Philadelphia, Captain Galton, late of the Board of Trade, and many professional men, on a system unknown and untried in the United Kingdom. Several pamphlets and official reports were, however, sent to the chairman.

"The Irish Tramways Bill, now before the third session, requires a few amendments which were suggested to the committee. To promote the good of the greatest number, not the interest of a few; to check undue monopoly on the one hand, and unnecessary opposition on the other, ought to be the objects of the legislature, which in some clauses of the bill have been overlooked, preventing tramways where places are united by rails, which ought to be left to the decision of the Board of Trade, or Lord Lieutenant of Ireland in Council, who can judge on the merits of each case, whether the requirements of the localities would warrant both, see clauses 8 and 22. With respect to corporations, clauses 17, 20 and 21 appear to give them too great a power, requiring the previous consent of $\frac{2}{3}$ rds, and the disapproval of only five members; all these could be better referred to the Board of Trade. It is to be hoped that the government will take up this measure and have it soon passed. Under its provisions, many useful works can be undertaken without the promoters being put to the cost of private acts, which proved so injurious to our railway companies, absorbing from 10 to 15 per cent. of the capital. It will give investments at home for our spare money, the lines being as useful to the country as they are likely to be profitable to the shareholders.

"In twelve cities of the United States, 500 miles of tramways were laid on the 1st January, 1860, 350 of these since 1858; grants for 200 more have been made. The annual increase on the same mileage was 17 per cent. in New York, and 20 last year in Brooklyn, showing their success; all are paying large dividends, with the shares at high premiums, when scarcely our railway is at par. Their cost compared with the London passenger railways would be from $\frac{1}{4}$ th to $\frac{1}{3}$ th per mile, though affording more accommodation to the public; yet we see an under-ground railway there commenced! In Ireland, with the exception of the Dublin and Kingstown, costing £62,000 per mile, at 100 premium—all the exclusively passenger railroads are at over 50 discount—the Cork, Black-Rock and Passage, Newry and Warrenpoint, Waterford and Tramore—tramways here would have paid well. From Bundoran, the Brighton of Ireland, they are proposed to Belloch on Lough Erne, and from the seaport of Donegal to Pettigoe, whence steamers, on the American principle with saloons overhead, are to run to Enniskillen, connecting them with the railways. In many of the mining districts as well as to towns and railway stations, several lines are proposed, all awaiting the passing of the Irish tramways bill. In this county the surveyor reported strongly to the Grand Jury in its favour, as Mr. Gray resided in the United States. I would especially refer to his report.

W. KERNAGHAN."

Offices of the American and European Horse Railway Company,
26, Great George Street, Westminster,
LONDON, March 1, 1860.

W. KERNAGHAN, Esq.,
Dublin Tramway Co., Dublin.

Dear Sir,—I can add little to the arguments expressed in my pamphlet on Horse Railways to the President of the Board of Trade, which have so strongly been endorsed by the Press of the kingdom, (the *Times* and *Liverpool Journals* leading the way), and which have in no case been refuted by those wedded to the existing slow-coach system. Thus far one and all favour giving it a fair trial.

The opinions of those who have witnessed the success of the American City Railways will be useful before the Parliamentary Committee.

Among a score of letters received from Members of both Houses of Parliament, including Lord Elgin, Baring, Bright, Gibson, Kennard, Jackson, and Mackinnon, let me record an extract or two—

From William Scholefield, Esq., M.P. for Birmingham. Feb. 9.

"I shall be very glad to give the subject a lift whenever I can * * *
I repeat, however, that I will with pleasure aid the movement as far as lies in my power, as I think it an excellent one."

From Hugh Cullen Eardly Childers, M.P. for Pontefract. Feb. 22.

"One of the things which above all others struck me, on my recent visit to New York and Philadelphia, was your wonderful City Railroad system. I have repeatedly spoken of it since my return, expressing surprise at not seeing so practical a method introduced into England. Your views shall have my best support."

From John Bright, M.P. Feb. 8.

"The subject is becoming of great importance in and to all our large towns."

Sir Edward Grogan, M.P. for Dublin, says, while thanking me for the pamphlet, that "I must be aware that the circumstances of America and the United Kingdom are not identical." In response, I have assured your city member that if he will appoint an interview to investigate the facts, I hope to convince him that the system is worthy of trial in British cities.

From Thomas Lloyd, Esq., Mayor of Birmingham. Feb. 13.

"I have sent a copy of the pamphlet to the Borough Surveyor, and I shall have the pleasure to read it the first leisure moment I can find, as it is a 'subject of great importance.'"

Joseph Heron, Esq., Town Clerk of the Corporation of Manchester, sends me the following minute. Feb. 16.

Resolved—"That the communication now read (letter *re* Horse Railways) be referred to the chairman and deputy-chairman to report thereon."

The Lord Provost of Glasgow, and the Chairman of the Metropolitan Board, London, have also the subject under consideration. The scheme is highly popular in Liverpool.

I find that I did Mr. Haywood, the Surveyor of London, an injustice, not having seen his report, by saying that he reported against the Tramway Bill; on the contrary, he has always been in favor of tramways. I have recently had an interview with him, as well as Mr. Newlands, the Borough Engineer of Liverpool, both of whom are giving the scheme their favourable consideration.

It is an unusual thing in this busy sceptical age to suggest a great improvement and find so few opponents. I am glad to see the Dublin Corporation have withdrawn their opposition to the Irish bill, for it is far better to be right at the start than to retrace their steps afterwards.

The following letter from Charles Mackay, LL.D., who recently made a lecturing tour in the United States, and whose letters to the *Illustrated London News* have been so widely circulated under the title of "Life and Liberty in America," shows his appreciation of the system.

"64, Lincoln's-Inn-Fields, Feb. 21, 1860.

"My Dear Train,—I have read with great attention and pleasure your pamphlet on the subject of horse railways in England. I admire the lucidity of the statements you make, and quite agree with all the arguments you bring forward in support of them. To any one who has travelled, as I have done, in the wide, spacious, comfortable, luxurious, and cheap cars, drawn by horses on the rails laid down in the thoroughfares of New York city, and of Boston, Massachussets, the omnibuses that ply in the streets of London and other great cities of England, appear positively barbarous. The cars that traverse

the streets in America are not only cheap to the passenger, but they are fit for ladies to travel in ; while the omnibuses of this country are not only dearer for their bad accommodation, but quite unsuited to ladies, and almost so to gentlemen. I cannot doubt that success will attend your efforts to introduce the American system here, if you can once bring the plan fairly before the public notice.—Ever yours truly,

CHARLES MACKAY."

Such evidence is trustworthy, and will be endorsed by Judkins, Lott, Shannon, Leitch, Stone, Lang, and Miller—names as widely known as is the popularity of the Cunard line.

The simple fact that *seventy millions of passengers*—passed over the City Railways of Boston, New York, and Philadelphia, last year, demonstrates their utility without a doubt. You can epitomise their merits in a nutshell ; you will travel for a less price—in less time—with less mud—less confusion—less accidents—less dust ; with the additional luxury of more room—more attention—more comfort—more light—more regularity—more facility of ingress and egress, and better ventilation.—Yours most respectfully,

GEORGE FRANCIS TRAIN.

Mr. W. H. Gregory, M.P., who has just returned from a visit to the United States, says—

"I am entirely in favour of tramways, especially for cities ; I have watched their working and their success in the American cities ; so far from creating obstructions, they prevent obstruction ; they are the greatest boon to the lower classes ; they are unaccompanied with any noise, and are the most comfortable vehicles I ever travelled in. In Philadelphia these tramways communicate with the stores of merchants, and give the greatest facility for commerce, rendering the transfer of heavy goods cheap and easy. I cannot understand the Dublin citizens wishing to be shut out from the advantages which are so manifest in these tramways. Rely on it the Americans are no fools in matters of business, and these tramways are spreading in every city of the Union, not only in the wide streets of Philadelphia, but in the narrow streets of New Orleans. They were resisted in some towns, as at Baltimore, but the resistance having been surmounted, those who were afraid of them are now loud in their praise."

The following letter is from Charles Burn, C.E., author of a very interesting pamphlet, published by Weale, on Horse Railways:—

2, Delahay Street, Great George Street, S.W.,
London, May 26, 1860.

Dear Sir,—I have to acknowledge the receipt of your pamphlet on City Railways, and fully concur in all that you have stated therein.

I have devoted considerable attention to the subject of Horse Railways, and have strongly advocated their adoption as a cheap and simple means for the construction of branch lines; the rails to be laid along the country roads, and by that means convert them into branch lines and feeders to our existing Locomotive Railways. I have published my views on this matter in a pamphlet, which I take the liberty of forwarding to you. I am only sorry that I had not the advantage of perusing your pamphlet previous to publishing mine, as I might have extracted from it much valuable and interesting information.

I shall very soon be actively engaged in carrying out the system in France. A concession has already been granted by the French government for one line of Horse Railway between the towns of Clermont and Riom, in the department of the Puy de Dôme, and several hundred miles are proposed to be carried out by the French government in other departments. The nett receipts on these French country lines, calculated from the *existing* traffic, will pay an interest varying from 10 to 16 per cent. on the outlay. We may reasonably conclude that with City Railways, having a much greater amount of passenger traffic, that the returns upon the capital will be much larger.

Should the system of Horse Railways become adopted in England, we shall have to thank America for this, as well as for many other useful inventions for economising labour, and we shall above all have to thank you for the great energy and perseverance with which you have worked to get the system carried out in Birkenhead, Liverpool, and other large cities. It will be an honourable distinction for that city in England which shall be the first to appreciate the advantages of the system, and follow the example of the great cities in the United States.

The system is sound in principle, and cannot fail to answer every expectation, both as regards accommodating the public and remunerating the

shareholders. I am thoroughly convinced that the system only requires to be shown in England to be appreciated, and that after one city has adopted it, the other large cities will rapidly follow.

Being confident that your exertions will be crowned with success,

Believe me, yours very truly,

CHARLES BURN.

George Francis Train, Esq.

From the Chief Engineer of the Birkenhead Street Railway
Company (Limited.)

26, Great George Street, Westminster, S.W.,

May 28, 1860.

My dear Sir,—In reply to your enquiry, I have examined and recommend the following routes in the neighbourhood of London as well adapted for the introduction of Horse Railways. :—

1. Regent Circus, along Piccadilly to Hammersmith, Kew, and Richmond.
2. Oxford Street to Notting Hill.
3. Bayswater by the Euston and New Roads to Moorgate Street and the Bank.
4. Bricklayers' Arms to Greenwich by the Old Kent Road.
5. Westminster Bridge to Clapham Park.
6. Whitechapel to Stratford-le-Bow.
7. London to Blackwall by the Commercial Road.
8. Westminster to London Bridge by the Borough Road, with Branch over Waterloo Bridge to Strand.

All the roads and streets embraced in the foregoing are wider and better adapted for the purpose than most of the thoroughfares in your American cities. This is a fact worthy of notice, as it is a common observation by those who do not understand the practical working of Street Railways, and the results consequent on their introduction in the classification and systematic regulation of traffic, that "the streets of London are too narrow for the purpose."

The prompt action of the Birkenhead Commissioners in acceding to your proposal to construct Street Railways in that township, shows how desirous we are in this country, in spite of prejudices, of availing ourselves of any invention or improvement that will add to the national wealth, by economising time and giving increased comfort and facility of locomotion in our crowded thoroughfares. If the system is successfully demonstrated at Birkenhead—about which I entertain no doubt—other corporations and trustees of highways will soon adopt it.

Possessing as you do the means to lay down these Railways, and having secured the patent for your car and roadway, the sooner you get the Birkenhead road in operation the better.

The specification and drawings for this the first improved Horse Railway in Europe are now complete, and I will take care that it is made a model road.

I have secured the services of Mr. Palles, a young Engineer, who has constructed several Horse Railways in Philadelphia, as resident Engineer, practically to overlook the work; and I am now arranging with Mr. Burns who has given his attention to this subject, to contract for it. We have reason to congratulate ourselves in the result of our meeting with the New Cross Turnpike Trustees on Saturday. These gentlemen appeared unanimous in their appreciation of the advantages of the system, and although the Chairman stated that there was no power in the act to enable them to adopt it, it was admitted there was nothing therein to prevent it.

On all sides the advantages which would result from Horse Railways are recognised, and no objection of any moment is raised against them. They will economise the public time by clearing the streets of obstruction; diminish noise; reduce the number of vehicles by increasing their capacity; greatly save the road repairs, and as a consequence reduce local taxation; save horse power and horse life; and greatly improve the value of the property through which they pass. When such results are to be attained, should we not make a bold effort to get a short general act passed, giving power to road-trustees, highway boards, and other corporate bodies having the custody of the roads for the public benefit, to enable them to make arrangements with parties willing to embark capital to lay down and maintain the rails, and work the passenger traffic therein, subject to all proper rules and regulations for the protection of the public?

Mr. Daniel Whittle Harvey, the Chief Commissioner of Police, has lately

shown that there is a daily influx into the city of 700,000 persons. To save a small portion of time daily to such a multitude is worthy of earnest and instant legislation.

Our next effort, therefore, should be directed to get this short general act passed as a measure of public necessity, and two years hence you will see the system in operation in this country to the extent of hundreds of miles.

I am, dear Sir, yours faithfully,

JAMES SAMUEL.

George Francis Train, Esq., Liverpool.

From the *Birkenhead Advertiser*, May 20, 1860.

HORSE TRAMWAYS.

When the Manchester and Liverpool Railway was projected, the country was up in arms—every existing interest was to be ruined, caricatures of starving horses, and coachmen out of work, were paraded in print-shops, owners of property along the projected line actually employed people to keep off the surveyors, and an amusing but instructive catalogue of difficulties is recorded in the life of George Stephenson thereon. The courageous patience and untiring perseverance of a few men overcame the prejudices of a multitude, and the railway was made. The largest coach proprietor in the district, as also perhaps in the country, the late Bartholomew Bretherton was wise in his generation, and made terms with the new locomotive creation by getting an allotment of shares in the railway, which in a few years more than doubled his already large fortune, and so far from horses becoming a drug in the market, or the Jehu's wanting occupation, it has been directly the reverse. Some publicans and posting-houses on the roads no doubt were deprived of a portion of their custom, but they found other channels for their industry, and the world has been an enormous gainer by the change. The determination to try the experiment of horse tramways at Birkenhead seems likely to^o elicit similar opposition on the part of some vested interests, although this is the year 1860, and not the year 1826. We hear of the injury to cars and omnibuses, of the traffic of the town being inconvenienced by such tramways passing through it, and we are told in the same breath that the enterprise is encouraged by some, because it will benefit property in the outskirts! We should like to know, if this latter statement be true, in *what way* can the

town of Birkenhead be injured, for if the branches or main arteries from it are in a healthy prosperous state, it must do good to the heart itself, and the more the branches yield the better the condition of the parent stem. It is confidently asserted, however, that these horse tramways will be a failure, and that other towns have rejected them; if such be the case, what occasion for such an outcry? the projector tries the experiment at his own cost, and in case of failure, "existing interests" come off victorious—a greater necessity than ever to the place. On the other hand, if the tramways prove a successful experiment, which we firmly believe they will, it is quite open to those who at present possess the road to make terms for themselves as the late Mr. Bretherton did, and to get their horses full employment. The admission that the tramways may benefit the out-townships, or property a little way out of the town, is fatal to the whole opposition case, as nothing can be clearer than the *public gain* under such circumstances, and that is the main question, not the mere loss or profit of a few individuals. No one we feel assured begrudges the gain of those who at present possess a kind of monopoly of the road, but surely the community at large are not to be inconvenienced, or the surrounding neighbourhood to be unaccommodated from considerations of this kind, which would be a barrier at once to all modern improvements. We say without fear of contradiction that if Mr. Train's enterprise does succeed (and who that is in the habit of going by the Railway omnibuses along the Liverpool docks can doubt it) that every public interest at Birkenhead, both town and neighbourhood, will be greatly benefited, the ferry receipts augmented, and property of all kinds improved in value. Are such results not worth a trial? We think they are, and that the Commissioners have done wisely and well in accepting Mr. Train's offer and securing improved transit for the township.

Meeting of Birkenhead Commissioners on 22nd May, 1860.

On Tuesday an adjourned monthly meeting, a special meeting, and an annual meeting of the Board was held at the Public Offices, Hamilton-square. John Laird, Esq., Chairman of the Board, presided, and the other members present were—Messrs. Rae, Keightley, Bradley, Harrison, Walker, Gough, Aspinall, Baylis, Willoughby, Cook, and Peck.

MR. TRAIN'S HORSE RAILWAYS.

The Chairman then introduced the subject of the adoption of Mr. Train's Horse Railways in the township, and reported that the committee appointed

by the Board to enquire into the securities of that gentleman had proved satisfactory. They had required that security should be given to the Board for £3000 in addition to the plant and materials laid upon the road.

Mr. Peck.—I thought it was £5000.

The Chairman.—Looking at the plant on the ground, it was thought that £3000 in addition would be ample security for the Commissioners.

Mr. Gough thought that the agreement between Mr. Train and the Commissioners should be read, and the whole details, such as the names of the sureties, &c., made public.

The chairman objected to that course as injudicious, and thought it would be sufficient for the public to know that the Board had got two good sureties.

Mr. Aspinall.—Mr. Gough, had you not better have it yourself and read it?

Mr. Gough.—Oh, no. Let the public have it.

Mr. Aspinall.—What have the public to do with it?

Mr. Gough.—Well, I humbly think they have everything to do with it.

Dr. Baylis.—Read what will inform us generally.

Mr. Gough reiterated his belief that the proper course to pursue was to publish all the details. The names of the sureties he maintained should be given to the public.

The Chairman considered it would not be fair to Mr. Train to do so, as well as unusual. The system when adopted would prove a great advantage to the township in reducing the wear and tear of the roads, while increasing the value of the property of the Commissioners in the neighbourhood of the Park and elsewhere. But it would not only be beneficial in these respects, but would also prove most valuable as an accessory to their ferry. They would not be justified, he believed, in refusing to give the system a fair trial after the very liberal terms that had been offered by Mr. Train. Indeed he had offered to them terms which he had refused to other towns. He presumed that he regarded Birkenhead as an eligible place, because it resembled most American towns in having long and wide streets; because it was comparatively a new place, and situated so near both to Liverpool and Manchester. For these reasons probably he considered it would be a very good locality to exhibit his plan. Since the question had come before them, he had heard the opinions of a great many persons, both in Liverpool and London, who had been in America, and had had an opportunity of

witnessing its operation, and they all agreed that it would be desirable to adopt the system in Europe. They told him that they did not know anything that would do more to develop the increasing facilities of the township. They could scarcely have expected from Mr. Train more than he had offered. But what was their position financially? He ran all the risks, and bound himself to lift the rails, and put the roads in a proper state of repair if they were dissatisfied with what he had done. Besides the whole of his plant, he had given them two sureties for £3000 against any possible loss the township might sustain. The Chairman having again adverted to the benefits the scheme would bestow on the township, in a financial point of view, by the value of its property being increased, concluded by moving the adoption of the agreement, as between the Board and Mr. Train.

Mr. Harrison in seconding the motion, stated that he was quite convinced after the liberal offers that had been made by Mr. Train that they could not reasonably refuse to give the plan a fair trial. He really felt that he had not done himself justice, but he had perhaps some other object in view and they were getting the advantage of it. With respect to the securities, they were very satisfactory.

Mr. Gough did not object to the scheme, but thought the public should know all about it. The names of the sureties in his opinion ought to be given.

The Chairman represented that it was an unusual proceeding.

Dr. Baylis at some length commented on the advantages the horse railway would be likely to confer on the town by concentrating the traffic of the Cheshire side of the water at Birkenhead, and making it the metropolis of the whole peninsula. There was only one thing he regretted, and that was that they had not taken Hamilton Street in their route. He thought the route ought to be made public.

The Chairman said that for the present it was proposed that it should start from Woodside Ferry and pass along Shore Road, Argyle Street, Conway Street, and to the Park entrance in Conway Street.

Dr. Baylis argued that it would have been most desirable to have taken Hamilton Street in their route. It was proposed he understood, to have two tracks laid, which he anticipated might cause some difficulty in working, and he represented that it would be a preferable plan to have the return rails laid in some other streets, as by spreading them they would increase the benefits

of the system. He considered that Hamilton Street ought to have a line through it in order to accommodate persons going to the market.

The Chairman stated that a memorial had been received from the residents in Hamilton Street, praying that a line should be laid along that route. His own impression was that the people of Grange Lane and elsewhere, instead of petitioning against the laying down of rails, would soon be memorialising Mr. Train to extend his omnibuses thence to every part of the town.

Mr. Harrison said that he apprehended there would be a difficulty in respect to Hamilton Street, as he believed no railway could be laid down the lower part of it near the ferry.

Mr. Aspinall had no doubt that Mr. Gough's hotel, which was the property of the Commissioners, would have eventually to come down in order to make room for a grand horse railway terminus. (Hear, hear.)

The agreement was then ordered to be sealed.

The popularity of the new system of Street Railways is shown by the petition to extend it to other streets. See report, Birkenhead Commissioners, Monday, June 4, in the *Liverpool Mercury*.

TRAMROADS IN THE TOWNSHIP.

A memorial was read from certain shopkeepers and other inhabitants of Hamilton-street, Chester-street, and the neighbourhood generally, calling attention to the proposed tramway to be laid down in Argyle-street, and praying that permission might be given to Mr. Train to lay a return tramway in Hamilton-street.

The Chairman thought the best thing to do would be to refer the memorial to the finance and road and improvement committees, to see what could be done to meet the views of the memorialists. He believed Mr. Train would extend his operations, but they were anxious to see the new system fairly started before they went further with it. There would be a memorial from the inhabitants of Oxtan and Claughton to have the tramways extended to those townships. He mentioned this to show that the commissioners did right to negotiate with Mr. Train to establish in this town a new system of

locomotion, which had been found, wherever adopted, to be a great benefit to property and a great convenience to the inhabitants of the place. He hoped Mr. Train would be enabled to meet the views of the memorialists by extending the system further through the town.

Dr. Baylis supported the prayer of the memorial, and after some further conversation the matter was referred to the road and improvement committee, with full powers to carry out an arrangement with Mr. Train for a return line through Hamilton-street.

The Chairman, John Laird, Esq., who has mainly advocated this improvement from the first, remarked, in responding to the vote of thanks passed by the board, that

The only thing he would further refer to was the proposed tram railway in the township. At first people were alarmed; but the best answer to that was, that he believed they would be inundated with memorials to secure the railway to all parts of the township. He would not, however, agree to this extension unless the property of the township was to be benefited. They had a large amount of property on the outskirts of the town, and they only wanted facilities like Mr. Train's railway to bring it into operation. He believed Mr. Train would carry out the scheme to any extent the township might think desirable; therefore, if it answered well, let them go on with it. If the landing-stage should be laid down in twelve months, and they got a railway down to it, they could run boats every five minutes, and thus put their ferry in a position not only to hand over the sum they had hitherto paid to the township, but to double it for the benefit of the ratepayers.

EXTENSION OF THE HORSE RAILWAY SYSTEM.

The following memorial, signed by forty-one persons, was read:—

TO THE CHAIRMAN OF THE BIRKENHEAD COMMISSIONERS.

The memorial of the undersigned, tenants in the Birkenhead Market, humbly sheweth:—

“ 1. That your memorialists have learned with considerable satisfaction that permission has been granted by your honourable board to Mr. Train to lay down lines of street railway from the neighbourhood of the Park to the Wood-side Ferry.

"2. That they believe such a line will tend to establish and maintain business along the route, and that therefore the Commissioners ought to take care that neither the township property nor their own tenants be left out in the many advantages to arise therefrom.

"3. That the memorialists strongly urge on the board, ere it be too late, to allow Mr. Train to lay down a return line from Oxtou and Claughton districts, along Hamilton-street to Woodside Ferry, so as to afford people every facility in reaching the market, and thus enable them to continue their purchases there, instead of going to Liverpool, or having their custom divided elsewhere.

"Soliciting your attention to this subject at your earliest convenience, your memorialists, as in duty bound, will ever pray."

Mr. Rae hoped that the committee to whom the memorial would be referred would bear in mind that the board had a very valuable frontage in Hamilton-street, and that the value of that property might be materially affected if they did not take the return line past the market.

The Chairman quite agreed in the prayer of the memorial, but what he had stated before was, that, as there was a strong opposition at first from some parties in the township, the best way would be to lay down one line with the consent of the Commissioners, and then leave it to the public to press upon the board to consent to an extension of the system. Memorials for an extension were coming in, and it was a proof that the Commissioners had acted wisely in the matter at the first. (Hear, hear.) Mr. Train had written to him to say that he would be down in a day or two, and it was hoped that a meeting of the committee and Mr. Train would take place, when, possibly, a second line might be arranged for; for, unless that was the case, the property of the board might be injured, and the interests of their tenants damaged. He (the Chairman) was told in Liverpool the other day, that Mr. Train's proposals were very favourably received by the Corporation, and it was likely his scheme would be carried out there. Mr. Train was having three omnibuses built in Birkenhead, and hoped to have the line down in July, and at work in August, so that before the present season was over the public of Birkenhead would have an opportunity of testing the value and the advantages of the new system. (Applause.)

Mr. Aspinall—Do you mean to divert the traffic from Argyle-street?

The Chairman—No. He is asked to lay down a return line along Hamilton Street, which is, I think, very desirable.—*Birkenhead Advertiser*, 16th June, 1860.

I am indebted to Henry V. Poor, Esq., the clever editor of the *American Railway Journal*, for the following *memoranda* of the Philadelphia City Passenger Railroads.

Routes of the several Lines.

Citizens'—Columbia Avenue to Read Street, on Tenth and Eleventh Streets.

Delaware County—West Philadelphia to Spread Eagle Tavern: commencing at the corner of Market and Logan Streets, West Philadelphia, and extending to the terminus of the Westchester Railroad.

Fairmount—Exchange, up Third Street to Race Street and Callowhill, thence by Twenty-third, Vine, and Second and Walnut Streets to the Exchange.

Fairmount and Arch Street—Second, corner Arch Street, to Twenty-first Street.

Frankford and Southwark—Through Berks, Sixth, Dickinson and Fifth Streets, with a branch to Frankford.

Girard College—Along Second and Arch Streets, up Ridge Avenue to Columbia Avenue.

Germantown, Fourth and Eighth Streets—Germantown Turnpike to Mount Airy.

Green and Coates Street—(1) Fairmount and Green Streets to Delaware River, returning by Oak and Coates; (2) Green, Dickinson, Eighth and Coates Street; (3) Green, Fourth, Walnut and Eighth Streets; (4) Green, Fourth, Walnut, Eighth and Coates Streets.

Heston, Mantua and Fairmount—Hestonville, via Lancaster Avenue and Ridge Street to Fairmount, with branch to Market Street.

North Philadelphia—Columbia Avenue, Broad Street, Tioga, Plankroad, Manheim, to Germantown.

Philadelphia City—Front, via Walnut to Twenty-second Street, returning by Chestnut Street.

Philadelphia and Darby—Market Street to Darby.

Philadelphia and Gray's Ferry—Third and Walnut, Second, Pine, Twenty-first and South Twenty-third to Gray's Ferry, returning by Spruce, Third and Walnut Streets.

Richmond and Schuylkill—Frankford Road, on Girard Avenue to west side of the Schuylkill River.

Ridge Avenue and Manayunk—Ridge Road to Manayunk.

Second and Third Streets—Third and Mifflin Streets, Oxford, Front, Amber and Frankford Road; Jefferson and Second to Mifflin, &c., &c.

Seventeenth and Nineteenth Streets—Master to Federal Street, on Seventeenth and Nineteenth Streets.

Thirteenth and Fifteenth Streets—Columbia Avenue to Carpenter Street, by Thirteenth and Fifteenth Streets.

West Philadelphia—Corner Third and Market to Depôt in Twenty-fourth Ward.

PHILADELPHIA CITY PASSENGER RAILROADS.

Mileage, Equipment, &c., on 1st January, 1860.

Corporate Title of Company.	Company Organised.	Road Completed.	Capital.	No. of miles of single track.	Cars.	Horses.	Men.
			DOLS.				
Frankford & Southwark (5th & 6th)	April 23, '56	Jan. 20, '58		16½	45	275	185
West Philadelphia (Market-street)	April 8, '58	June, '58	250000	12	42	204	129
Citizens' (10th and 11th Streets) ..	May 11, '58	July 29, '58	500000	7½	43	226	117
Fairmount (Race and Vine Streets)	April 7, '58	Sept. 8, '58	300000	5½	26	170	96
Gray's Ferry (Spruce & Pine Streets)	May, '58	Sept. '58	500000	6½	24	121	59
Second and Third Streets	April, '58	October, '58	500000	19	67	410	226
Philadelphia and Darby	August '58	Dec. 24, '58	200000	8	16	51	29
Girard College	May, '58	March, '59	500000	6	18	108	155
Green and Coates Streets	April, '58	May, '59	400000	10	40	290	159
Arch Street	April, '58	June 23, '59	200000	7	18	140	108
Germantown	Dec. 22, '58	July 19, '59	500000	19	33	550	119
Ridge Avenue and Manayunk	March, '59	July 2, '59	250000	8½	12	95	42
Hestonville and Mantua	May, '59	October, '59	300000	7	15	90	50
North Philadelphia	May, '59	Novemb. '59	75000	6½	8	56	40
Philadelphia City (Chesnut and Walnut Streets)	May, '59	Novemb. '59	750000	4	20	140	80
Richmond and Schuylkill	May, '59	Novemb. '59	100000	7	11	50	75
Seventeenth and Nineteenth Streets ..	July, '59	Novemb. '59	300000	6	15	90	100
Thirteenth and Fifteenth Streets ..	October, '59	Dec. 12, '59	300000	6	20	150	109

5, Temple-place, Liverpool, 29th Feb., 1860.

THE WORSHIPFUL THE MAYOR OF LIVERPOOL.

Sir,—Respectfully requesting reference to my communication of the 17th instant on the subject of street railways in Liverpool, I now hereby ask of yourself and the town council permission to lay down lines along the following omnibus routes, and beg to assure you that I have the means for successfully completing and working all such lines. Of this I am prepared to furnish proof if required :—

From the Exchange to	Aigburth and Garston, along the present omnibus route, and (or) South John and Duke-streets.
„ „	Kirkdale and Walton, along the present omnibus route, and (or) Dale-street, Shaw's-brow, Islington, St. Anne-street, &c.
„ „	West Derby.
„ „	Cabbage-hall.
„ „	Fairfield and Old Swan.
„ „	Edge-hill, Wavertree and Woolton.
„ „	Bootle and Waterloo.
„ „	Rodney-street and Falkner-square.
„ „	Mill-street.
	(Along the present omnibus routes.)

Of course, I should be disposed to deviate from the above thoroughfares in any way that might be suggested by the borough engineer.

The only privilege I shall require in consideration of the capital, time and labour expended, will be the exclusive right to run on the rails a particular kind of car with flanged wheels. All other ordinary vehicles—carriages, carts, omnibuses—may use the rails at all times, with the simple condition that they shall move off when the regular rail car approaches, so as to allow it to pass without obstruction or delay. I can show to you and the council that this system of locomotion will greatly facilitate traffic through the streets, will effect an important saving in the paving rates, and will, in fact, prove a boon of infinite value to the town and the public.

I would willingly limit myself, in the first instance, to some short route for trial, with the understanding that, should the experiment prove successful, I shall receive authority to extend it to other places.—I am, sir, your most obedient servant,

GEORGE FRANCIS TRAIN.

JAMES NEWLANDS, Esq., C.E., the Borough Engineer of Liverpool, has made an elaborate Report upon my application to the Chairman of the Special Joint Sub-Committee on Tramways, quoting extensively from evidence taken in Boston—giving letters from residents in the United States—and summing up his Remarks by advocating the adoption of Street Railways, from which I make the following Extracts :—

Our experience of stone tramroads in Liverpool teaches us forcibly that, within certain limits as to gradients, they economise tractive force and reduce the cost of maintaining the portion of the roadway which they occupy. Further, by confining vehicles to a defined track, they systematise and thereby facilitate traffic. The stone tramway is merely a rude and imperfect form of the railway; and, therefore, whatever advantages accrue from the use of the ruder form may be expected to be increased by the adoption of the more perfect system. * * * * *

In order to form an opinion of the effect of railways in the public streets it was necessary to seek for information from places where they are already in extended use, and I accordingly sought for and obtained from America a mass of evidence—conflicting, it is true, in respect of some of its details, but establishing incontestably the following points :—

1. That the introduction of horse railroads, even under a monopoly and mismanagement, has been a boon to the community, especially to the humbler classes of it.
2. That it has (to use the words of the *New York Herald*) “organised and systematised traffic, and has rendered commodious those streets which were previously crowded and impassable by the irregularity of the driving.” * *

MR. NEWLANDS concludes his Extracts of Evidence taking in Boston, by quoting the following summary from Mr. W. Whiting.

“The running of cars upon a track in the more crowded parts of a city has the effect of *systematising and harmonising the line of travel taken by carriages passing each other. The concentrating of a great amount of travel into conveyances which are compact in form, tends to keep the streets clean.* I have seen from sixty to seventy persons in and upon a single street car transported at about the rate of four miles an hour through the streets of the city by one

pair of horses. The same number of travellers would have filled five omnibuses, with twelve in each, the usual number, and have required ten horses to draw the same. Having experienced myself, for years, the inconvenience of driving my carriages upon the omnibus routes, I should far prefer to have the public travel accommodated by street cars and rails than by omnibuses, without reference to the use of these cars myself for my own convenience. I have found omnibus drivers quite often to be careless, not unfrequently to be overbearing in the use of the public streets, as against gentlemen driving private carriages, and it has heretofore been found difficult, without the use of brakes upon the wheels, to stop the omnibuses when under much headway, particularly on descending grades, with sufficient promptitude. This difficulty is remedied by the machinery of the street cars. I think, also, that the crossing of the streets by foot passengers is far safer with street cars than with omnibuses, for obvious reasons. In regard to the inconvenience of travelling in the cars, I have found none, and I know of none. They pass at short intervals to and from the different parts of the city, thus accommodating travellers far better than by omnibuses, because the cars take out great loads at once, and travellers are not obliged to linger about the streets after they are ready to start, waiting for their turn in the omnibuses, but can start at once, the omnibuses being able to take but a few at a time. I have been sometimes obliged to wait three-quarters of an hour to get a chance to get into a Roxbury omnibus in an ordinary rainy day. I have never been compelled to wait five minutes for the want of some car going to Roxbury, in which there was room to ride. Considering the very large number of travellers having occasion to pass to and from the city every day, and particularly that large class of citizens who reside in the country and have their places of business in Boston, comprising by far the greatest amount of travel in and out of the city, exclusive of steam railroads, it is almost impossible to estimate the amount of convenience, comfort, safety, and economy of street cars, as compared with conveyances by omnibuses."

This is the conclusion which Mr. Newlands arrives at in his able Report :—

So far, therefore, as the traffic is concerned, I see no difficulty in the way of introducing horse railroads. Their advantages are proved to have been great, and the evils attending them few, even under systems of monopoly and mismanagement; and the evils I believe to belong simply to malconstruction, and may be easily avoided.

In all the projects for horse railroads which have been brought under the notice of the council, I believe it is proposed that the carriages should not exceed six feet in width over all, and only a single line of rails is proposed to be laid. The track would necessarily occupy the centre of the street or road, and would be used by the loaded omnibuses, leaving the wings on each side for ordinary traffic. If the rails were laid as above suggested, one wheel of a vehicle on the wings might work in the track, and it is easy to see that there is in this arrangement the rudiments of a systematic regulation of the traffic in the great thoroughfares.

I append a list of the streets which are the routes of the omnibuses, shewing their widths between the kerbs, and also their gradients. The narrowest of them is Church Street, which is only 28 wide feet from kerb to kerb. In this case the railway track would require to be placed nearer the south side, so as to leave ample space for two ordinary vehicles on the north side of the track for only one on its south side.

LIST OF THE STREETS LYING IN THE COURSE OF OMNIBUS
TRAFFIC, WITH THEIR WIDTHS AND GRADIENTS.

	Footpaths		Carriage-ways.		Total Widths.		Gradient.
	Ft.	In.	Ft.	In.	Ft.	In.	
Dale Street.....	12	0	36	0	60	0	Level to M'chester St., East End.
Shaw's Brow.....	15	0	36	0	60	0	1 in 34
	9	0					1 in 18
London Road.....	12	0	36	0	60	0	1 in 27
Prescot Street	13	0	40	0	66	0	1 in 32
Kensington... ..	8	0	44	0	60	0	1 in 75
							1 in 22
							1 in 50
							1 in 30
							1 in 340
Castle Street.....	12	0	34	0	58	0	1 in 290
Lord Street	15	0	62	0	92	0	1 in 43
	12	0	49	0	73	0	1 in 50
Church Street	9	0	28	0	45	0	1 in 32
Bold Street.....	8	0	24	0	40	0	1 in 90
Berry Street	8	6	27	0	44	0	1 in 60
Great George Street	8	0	28	0	44	0	1 in 133
	13	0			54	0	1 in 24
Park Road, from North Street to Wel-	6	0	30	0	42	0	1 in 28
lington Road.....	6	6	32	0	45	0	1 in 80
Park Road from Wellington Road to	8	0	34	0	50	0	1 in 60
Peel Street.....	10	0	30	0	50	0	1 in 57
Mill Street.....	10	0	35	0	55	0	1 in 80
St. James' Place	5	0	22	0	32	0	1 in 34
St. James' Street.....	11	0	36	0	58	0	1 in 32
Park Lane	9	0	30	0	48	0	1 in 80
South Castle Street	8	0	35	0	54	0	1 in 70
Moorfields	10	0	35	0	54	0	1 in 48
North John Street	8	0	26	0	44	0	1 in 60
South John Street	10	0	24	0	40	0	1 in 30
Renshaw Street	10	0	27	0	52	0	1 in 24
Commutation Row.....	10	0	24	0	48	0	1 in 200
Islington.....	8	0	23	0	37	0	1 in 20
St. Anne Street.....	12	0	34	0	58	0	1 in 280
Richmond Row.....	10	0	40	0	60	0	1 in 60
Fox Street	10	0	40	0	60	0	1 in 180
Great Homer Street	10	0	34	0	56	0	1 in 440
Moss Street	8	0	24	0	44	0	1 in 76
Brunswick Road	9	0	30	0	48	0	1 in 27
West Derby Road	10	0	40	0	60	0	1 in 140
Pembroke Place	10	0	30	0	50	0	1 in 66
West Derby Street	8	0	24	0	40	0	1 in 50
Irvine Street.....	8	0	23	0	44	0	1 in 36
Wavertree Road to Tunnel Road	8	0	28	0	44	0	1 in 48
Wavertree Tunnel Road to Railway	8	0	30	0	46	0	1 in 88
Bridge.....	10	0	36	0	56	0	1 in 50
Edge Lane, Duke Street to Rake Lane...	7	0	27	0	43	0	1 in 35
Edge Lane, from Rake Lane to Beech							1 in 44
Street							1 in 70

TRAMWAYS REPORT FOR THE CORPORATION OF MONTREAL.

TO HIS WORSHIP THE MAYOR, ALDERMEN AND CITIZENS OF MONTREAL.

The Road Committee respectfully report—

“That in compliance with a resolution of the council, adopted on the 13th of December last, they have taken the necessary steps to obtain information in reference to city passenger railways, and the conditions and regulations that should be embraced in a by-law authorising their construction and use in this city; and, as the result of their investigations, they beg leave to submit the following particulars:—

“Your committee find that in the principal cities of the United States, where horse railways are now in pretty extensive operation, they are generally regarded as a great public convenience, affording a cheap and pleasant mode of conveyance without the noise and dust, the inconvenience and danger to foot passengers, occasioned by omnibuses, hacks, and other similar vehicles. When properly constructed they improve rather than injure the roadway for other carriages; in narrow streets they greatly relieve both the carriage-way and side walks, they bring those portions of cities most remote into comparatively close proximity to each other, and they have invariably increased the value of real estate in the suburban districts from 40 to 50 per cent., while they have effected no perceptible diminution in its value in the more central and business portions of the cities in which they have been constructed. In view of these facts, and many others might be mentioned, your committee are strongly in favour of the establishment of passenger railways in the streets of Montreal. Your committee recommend to grant the privilege to William Molson, Sir George Simpson, Thomas Ryan, and their associates and successors in the company to be formed and known as the ‘Montreal City Passenger Railway Company.’ Your committee further recommend that the privilege be granted to the said company to lay down single railway tracks and to run passenger cars thereon through the various streets and roadways enumerated in the schedule, to be divided into districts Nos. 1, 2, 3, and 4, together with all such curves, sidings, and turn-outs as may be necessary for the right working of the cars over such tracks by horse traction or such other motive power as may hereafter be determined on. [Here follow the numerous conditions, a few of which we give.] ‘Fares not to exceed 5c. (2½d.; cars to run at intervals not exceeding 15 minutes, from six a.m. to eight p.m., through district No. 1, and not exceeding 30 minutes through the others, and as much oftener as the public convenience may require—speed not to exceed six miles; to be prohibited from stopping at crossings or in front of intersecting streets, unless to avoid collision; to be under supervision of city surveyor and road committee. Com-

panies to repair the road between the rails, and three feet on each side, and to conform to the grades of the streets. Council to reserve the right of constructing and repairing drains, gas and water pipes, or for other purposes; the rail to be employed, the flat one now used in the city of Philadelphia, and the cars to be approved by the road committee and council.

“In conclusion, your committee would respectfully state that they are largely indebted to the city authorities of Boston, New York, and Philadelphia, and to many other parties, for much valuable information in reference to the construction and working of horse railways in cities, which will be available to the council in framing a by-law, and they would recommend that the attorney of the corporation be instructed immediately to prepare and submit to this council such a by-law, embracing the foregoing conditions, with many others that may be deemed necessary.”

26, Great George Street, Westminster, S.W.

June 12, 1860.

Dear Sir,—Will you permit me to hand you the accompanying Clause, which the Liverpool Corporation propose to have inserted in the Highways Bill.

The advantages of these Tramways are so self-evident, that I am confident this matter will be found well worthy of, and will meet with, your cordial support. Most respectfully, your obedient Servant,

GEORGE FRANCIS TRAIN.

The following Amendment for Highways Bill was moved in committee, by Mr. Horsfall, M.P., and printed in the votes, 13th June :—

It shall be lawful for the surveyors of any Highways, whether acting under the powers of this Act or otherwise, to lay down, or to authorise any persons to lay down, iron or other Tramways, approved by such surveyors, on any part of any Highways under their jurisdiction, for the purpose of facilitating

the traffic on any such Highway, and to make such rules and regulations for the use of such Tramways as such surveyors may deem expedient, and any person guilty of a breach of any such rules or regulations shall for every offence forfeit a sum not exceeding five pounds, on conviction before any justice having jurisdiction where the offence shall be committed.

Among the members of parliament to whom I have sent the above note are—Lord John Russell, Right Hon. Milner Gibson, Cardwell, Bright, Thomas Baring, Childers, Dunn, Sullivan, French, Gregory, Scholefield, Ewart, Redman, Ennis, Brady, McCann, Buchanan, MacKinnon, Coningham, Jackson, Greene, Ingram, Kennard, Henry Baring, Hon. Ralph Dutton, Lindsay, Macaulay, Cobden, Crawshay Bailey—several of whom having observed the successful working of these railways in America, have shewn an active interest in advocating a trial of the system in England.

OPINIONS OF THE PRESS.

From the Liverpool Post, February 3, 1860.

SPEED IN OUR STREETS.—The older the world gets the faster it goes. Extensive locomotion is a consequence of extreme civilisation. Lords and ladies move slowly, but every body else goes fast, and so much the better for lords and ladies. A hundred years ago one coach ran between Liverpool and London, and it took three days to perform the journey either way. The mail coach was a great improvement; but the railway carriage was perfection. The omnibus was born of the railroad system; but from attending at first at the stations, they in time contrived to carry passengers in the streets. A great good they were, but we are now told their day is past, and that they must give way to railway carriages on street railways. The present vehicle is too slow, and not large enough.

We are told that things that are new should be proposed as things forgotten; but it frequently turns out that the new things are only resuscitation of things very old. Railways are very old: the rails were stone, not iron, but the principle was the same. They are still to be seen running from the quarries of Egypt and Greece, and meet the eye on entering Pompeii. The old Duke of Bridgewater anticipated the present day when he expressed his dread of tramways superseding canals.

If you want to know how anything new ought to be done, see how they do it in America. Circumstances in that country made men inventive. Without an extraordinary aptitude for overcoming difficulties they never could have got on; and, in consequence of this aptitude becoming a second nature in them, they are going on still. They will never stop; their motto is, "Go ahead." The cradle is rocked and apples peeled by machinery, and at this moment we are franking the *Daily Post* by an American contrivance, and are to print it by another by and by. The last social improvement is street railways; and Mr. GEORGE FRANCIS TRAIN tells us, in a pamphlet just printed, that "the age of omnibuses in crowded cities has passed. That of horse rail-

ways has commenced. . . . These street railways have been now for some time in use in New York, Brooklyn, Philadelphia, Boston, and other places, and new as their introduction has been, their success insures their extension. As might be expected, the carriages in running upon rails do not injure the pavement, while they relieve the thoroughfares from being crowded or blocked up. In New York the greater portion of drays, carts, 'buses, private carriages, occupy the rail, turning out only when the passenger car arrives, when they again take the track, as it is so much easier for the horses, and less wear and tear for the teams." Every improvement, however, has to encounter opposition; and as yet, though strongly recommended, the metropolis has not availed itself of street railways. But in Liverpool they have been introduced, without reference to railway carriages. Enterprising omnibus owners, however, did put omnibuses on the lines, and until this week they ran daily along the whole length of the docks, from north to south, with admitted convenience to the busy public on our quays. The Dock Board having laid a tax on each omnibus equal to £100 a year, the proprietors ceased to run them. Mr. TRAIN, as may be seen from the proceedings of the Board yesterday, offers to pay the tax, and run railway carriages on the rails. He is, we understand, the representative of a large company, and the object is to introduce the American system into all our streets. In the true American fashion he gives reasons for what he proposes to do. . . . Why should not Mr. TRAIN be allowed the opportunity of showing what can be done? He wants nothing but permission. Surely it will not be refused.

NEW RAILWAY OMNIBUSES AT THE DOCKS.

A letter from Mr. GEORGE FRANCIS TRAIN, addressed to the chairman, was next read as follows:—

"Dear Sir,—I observe that the charge for occupying the rails along the docks with omnibuses is one shilling a journey, or sixpence each trip, north and south; and noticing that the omnibus proprietors have withdrawn their buses on account of that charge, I hereby tender for the said service at the terms proposed. I ask for no other facilities than were accorded the late occupiers; and I can give you references as to my ability to accomplish the work as well. Any information required I shall be glad to give you in writing or in person, as you may direct."

The Chairman.—Mr. Train is a gentleman tolerably well known to most gentlemen of the committee. Perhaps this letter will be referred to the works committee, who may be glad to see him personally.

Mr. Laird supposed there could be no objection to treating with him, if he accepted the terms proposed.

The Chairman, after explaining the reasons why the late occupiers had withdrawn their omnibuses from the rails to the road, remarked that Mr. Train was a very intelligent man, and he said he should be glad to run omnibuses on the very terms alleged by the others to be too high.

Mr. Forwood hoped the whole question of affording encouragement to such a system would be considered, for in its development he could see great advantages to all.

From the *Liverpool Mercury*, February 3, 1860.

HORSE RAILWAYS.—To practical business men, in a large commercial community like ours, omnibus tramways need only the recommendation of safe practicability. No thinking man, accustomed to the busy thoroughfares constituting the routes of the public conveyances to and from our out-townships and residential suburbs, has any doubt of the advantage to man and horse, passenger and pedestrian, that would be gained by taking our heavily loaded public vehicles from off the hard, uneven, boulder or square-set pavement, and the muddy or dusty macadamised road. As yet, only a limited portion of our population has had the opportunity of testing the difference between the jolting, clatter, and the delay of the common road and the pleasure and noiseless expedition of a horse railway, and for the present they are doomed to return to the vehicular *status quo*. MR. GEORGE FRANCIS TRAIN, the agent of several American capitalists who seek to introduce the American system of horse railways into Europe, is in the town and has actually made an offer to the dock board to take their line of railway on the terms upon which the local proprietors have refused to retain it. Of course, with this offer before them, the dock board can afford to disregard the local proprietors for the present; and perhaps it may be the board's duty, as a public body, bound to consult general convenience and their corporate interests, to let MR. TRAIN run his horse train on the dock railways. Under any circumstances, this complication of matters—the suspension of the comfort and convenience temporarily afforded to one part of the community, and the proposal to render the daily journeys of another portion of the population more pleasant, expeditious and safe—will create a more general interest than has hitherto been felt in the question of the road *versus* the rail. MR. TRAIN has sent us a pamphlet which is a compilation of opinions and statistics, the results of experience,

in which he sums up the advantages of the new system in the following terms:—
 We find that MR. TRAIN alludes to the Liverpool experiment. He says there seven omnibuses, which make seven journeys in winter and eight in summer each day, and therefore the board would realise, on the terms that have been paid, a revenue of nearly £1000 a-year. The horse railway, he remarks, is an invention of years ago; but the Americans were the first to apply it to any extent in cities; and it is a singular fact that the first locomotive railway in Scotland (from Paisley to Renfrew, three miles) is now the first horse railway.

Competition between MR. TRAIN and his friends, and Messrs. Gates and Dolby, and the Messrs. Busby, involves nothing in itself which can be objected to, so long as their is sufficient regard to public convenience and personal safety; but it is a question whether the interests of the public would be compromised if any private persons were allowed to lay down railways in our streets. This may lead to "vested interests" and monopolies, always difficult to deal with. If the experiment is to be tried, ought not the railway to belong to the town council, who would let them out to competing omnibus proprietors on the best terms that were compatible with efficient and safe service, and under restrictions rendering the lessees amenable to the criticism and control of the public through their representatives?

From the *Northern Times*, February 4, 1860.

STREET RAILWAYS.—That the Americans have got considerably a head of us in the means and appliances of locomotion, whether by land or water, every one who has visited the United States must be well convinced; and in nothing, perhaps, is their superiority in this respect more conspicuous, than in the excellent substitute they have provided for the cumbrous and inconvenient omnibus in crowded cities, by their Street Railways. These Railways are provided with spacious and commodious cars, which are drawn by horses—or by mules—and they afford an amount of accommodation for passenger-traffic, which no extent of omnibus provision that our streets could contain would ever be able to furnish. The lines, of course, extend to, and often beyond, the suburbs—just as the routes of our omnibuses do;—and the facilities they afford for people moving about in all directions, conveniently and economically, far exceed anything that we can yet boast of in this country. . . . The slightest thought, indeed, must satisfy any one of their great utility,—of their vast superiority over omnibuses,—of

their being, in short, a public convenience which every populous town would find it advantageous to adopt. These advantages, however, require to be witnessed in order to be fully appreciated ; and Englishmen who have experienced them, in the American cities, are generally struck with them as presenting one of the greatest improvements in locomotion, for urban and suburban purposes, of this improving age. Through the enterprise of an American gentleman, well known in Liverpool, it seems we are about to have this great improvement introduced here. MR. G. F. TRAIN has not only published an interesting pamphlet on the subject, with a copy of which he has kindly favoured us, but he has himself offered to undertake the experiment upon the rails of the Dock Company, along the line of Docks. . . . But Mr. Train is not alone in this movement. The Messrs. Busby, the extensive omnibus proprietors, have applied to the Town Council for permission to lay down rails from the top of Lord-street to Old Swan, a distance of three miles into the suburbs. Let us hope, then, that the subject will meet with the careful attention it deserves. As Mr. Forwood so well observed at the Dock Board on Thursday,—“He hoped the reference to the Works Committee would not be upon the simple question of the rate to be charged. The question should be fairly looked at. In other countries millions of passengers passed over these iron roads, and in this town no doubt it would be a great public convenience, both as respected goods and passenger traffic. He did not see how they were to work the immense traffic upon the road up to the Canada Dock without the adoption of this principle of carriage. He hoped the whole question would be considered by the Works Committee, not merely with a view to imposing a tax, but with a view also to affording every facility for conducting the immense traffic on the line of docks.” This as regards the route along the line of docks. It is the right spirit in which to consider the question ; and let us hope the Town Council will take it up in that spirit, as well as the Dock Board.

From the *Liverpool Mail*, February 4, 1860.

STREET TRAMWAYS.—MR. GEORGE FRANCIS TRAIN, our extremely “fast” Yankee cousin, famous for making galloping speeches, writing galloping books, and galloping himself round the world—one while in Massachusetts, and presto in Melbourne, then turning up at Calcutta and next contemplating a run through China—has revisited Liverpool, and has just published a characteristic pamphlet, entitled,—“*Observations on Horse Railways.*”

His pamphlet brings into one focus the chief arguments which, for the last two years, have been urged by *The Times* as well as by scientific journals and embryo companies, in favour of tramways worked by horse-power, advocating them as a great means of expediting and easing omnibus traffic through the wider streets of great cities; and particularly in London and Dublin. Its promised boons are increased speed, reduced fares, smoother movement, superior safety, and less road repairing for the parish to defray. And it fortifies its proposals for their general adoption throughout the greater cities and towns of the United Kingdom by American schedules and returns, showing their useful and profitable and generally successful working in the principal cities of America.

Observant Englishmen, however, who have witnessed their actual working in American cities, pronounce very opposite opinions on their general utility. We believe that Mr. Braithwaite Poole, who recently returned from a tour through the States, is strongly impressed with the extreme desirability of bringing omnibus tramways into town use here: whilst the Hon. Grantley Berkley, still more recent visitor, in his second letter to the *Field*, deprecates them as "tyrannically democratic," and "an incubus on the locomotive freedom of the world." Yet, so far as the experiment of large omnibuses traversing the line of tramway along our docks has been tried, there is no gainsaying that their smooth and comparatively noiseless motion renders them very popular with the masses, who naturally prefer them to the crowding and rumbling of the smaller street busses. Notoriously, it will be a public disappointment to many of the humbler classes if the late proprietors of the dock railway omnibusses, or in their default if another party Mr. TRAIN himself whose name and nation alike guarantee his working the line with energy, and who has formally tendered to work it, should not be able to propose terms to the Mersey Docks Board, sufficiently reasonable and satisfactory to secure the use of the dock tramways all the year round. Indeed, so popular are these tramway omnibuses already, that an extensive firm of omnibus proprietors, the Messrs. Busby, have just made formal application for permission to lay down, of course at their own expense, a line of iron tramways for their busses to start from the top of Lord-street and follow the usual route to the Old Swan. . . . Now, remembering that American "capitalists" are rarely philanthropists, we are somewhat puzzled to comprehend Brother Jonathan's affectionate anxiety to extend this "improvement" for John Bull's especial benefit. Are we to have an American railroad omnibus company in Liverpool, just as there was a French omnibus company in London? Or have these "capitalists" some private interest in any patented break for

tramways? Or is it merely a proposed exchange of compliments, a kind of national return-visit, to evince a readiness for "mutual investments," seeing that another pamphleteer has the hardihood to urge English green-horns to dip deeper into "American Investments," at the very time poor Cobden is said to have lost his whole "Seventy Thousand" in American railroads? However all this may be, it is rather funny that Yankee speculators should be so eager to instruct us in a facile plan of Home Railway locomotion which was first originated, and is still in daily use, in various parts of the United Kingdom. Within the last twenty years, we have had occasion to travel by various English, Scotch, and Welsh tramways, including each of those instanced by Mr. TRAIN; and we have long been convinced of their great advantages, particularly for suburban and hilly districts—provided always that obvious improvements were made both in the rail and in the carriage. Returning from Loch Katrine on the day the "Australian" grounded and stopped all the traffic of the Clyde, we had no means of getting from Bowling to Greenock, except *via* the Renfrew tramway to Paisley; and it was almost marvellous to find a huge and rude machine crowded inside and out, and with which, after the railway porters had once pushed it into motion, a single horse trotted off for three miles, apparently with much more ease than four horses would have drawn it on a common pavement. Only lately, too, we were much pleased to notice at Carnarvon smart first-class and second-class carriages in miniature, which (from the popularity of the tramway with the farmers and market people) have now superseded the lumbering open vehicles, little better than rough slate-waggons, which tourists will recollect as formerly in use for visiting the wild vale and quarries of Nantlle. Judging, moreover, from the great saving of horse-power already effected by simply introducing into Water-street and other steep inclines those lines of *flagged wheelways* which have long been in vogue even for dead levels in great Continental cities,—we are inclined to think that iron tramways would also be found extremely facile and useful within the wider streets of our own town. But, whether single or double lines be used, we equally agree with "the leading journal" that they ought to run in the middle, and not at the sides of streets—American fashion. Of course, any such scheme will have to conciliate divers interests—Gas and Water companies, and the Sewerage and Paving authorities. Nor will it fail to encounter strong opposition from all those who use their own carriages, or ride valuable horses, unless the general convenience of all classes be provided for, and all inconvenient monopoly of right of road guarded against. Mr. TRAIN's System seems to promise fair to embrace the improvements we

have long desiderated. He says, "the *improved* rail is nearly flat, even " with the surface, and some five inches wide ; *no groove impedes the general* " *traffic* and the guage admits *all* vehicles that prefer the track to the pave-
 "ment." But may *all* vehicles (except, perhaps, rival companies of railroad omnibuses) use the "track" free of charge? If so, and if there be no risk of wrenching off the wheels or the springs of light carriages, or of throwing down horses, then we should warmly hail this 'improved tramway.' Mr. TRAIN glowingly depicts many other and great advantages. We have quoted enough to show it offers fair for "getting along," and smoothly.

From the *Liverpool Chronicle*, February 4, 1860.

The local journals of yesterday are full of the new project propounded by Mr. Train, an American gentleman, well known in Liverpool, the energy of whose character has earned for him the enviable soubriquet of the *express train*. Mr. Train is desirous of substituting railways in the principal thoroughfares of the great towns for the present tardy and inefficient mode of conveyance by omnibuses and other vehicles, and the object of his pamphlet is to show the advantages which will accrue to the public by the change.

. . . . In a commercial point of view, these horse railways are declared to be highly remunerative, and the statistics of the second avenue railroad in New York seem to prove this assertion. The speed per hour is five miles, including stoppages, and it conveyed *four millions and a half* of passengers in one year, paying a dividend of six per cent., and not a single accident had occurred. Mr. Train also shows that the five city road railways in New York conveyed, during the year, nearly *thirty-five* millions of passengers! Some of these undertakings pay as much as *twelve* per cent. The following is the testimony of an English member of Parliament, Mr. Scholefield. . . If this system can be introduced into Liverpool with the same success which appears to have attended it in New York it will be a real blessing to the inhabitants, for the crowded state of our thoroughfares, as we have often had occasion to show in these columns, is a positive evil—a crying nuisance, which "has increased, is increasing, and must be diminished." Mr. Train is the representative of an influential Transatlantic Company, who seek for a return on their capital by the introduction into this country and the States of the Continent of the new system. On Thursday, Mr. Train made an application to the Mersey Board for the use of its railway along the Docks, and his application was referred to the Works' Committee consideration, the chairman of the Board,

Mr. Charles Turner, paying at the same time a handsome tribute to Mr. Train's personal respectability and talent. It is a singular fact that, only the week before Mr. Train came before the Liverpool public with this proposition, the very dock railway which the American speculator now requires for testing his principle was abandoned, by two local omnibus proprietors, on the ground that they found the charge by the Dock Board for the use of the line—sixpence each way—unremunerative. If the transatlantic energy which Mr. Train possesses does not open the eyes of these 'bus proprietors we shall be greatly surprised. Considering the extent of the line of docks—not less than five miles between the south and the north—and the enormous floating population always on the move, here, if anywhere, the experiment ought to have answered. Either those who have abandoned the field which Mr. Train now occupies did not know how to work the business with advantage, or the habits of the people of New York and Liverpool differ very materially. If the benefits held out by Mr. Train's pamphlet are realised everybody will gain, but most of all, we hope, the enterprising speculator himself.

From the Liverpool Courier, February 4, 1860.

HOW ARE OUR THOROUGHFARES TO BE IMPROVED?—A pamphlet, entitled "Observations on Horse Railways," by Mr. Train, addressed to the President of the Board of Trade, together with a personal acquaintance with the system as largely developed in the United States, and its great importance at the present time, bring this subject before our consideration. It is one which cannot be well considered without special reference to America, nor is it the least of the social questions of the day. In this transition period, between small things and great, between the old stage coach and the gigantic strides of steam, between the wooden vessel and the full-powered steamship, between the street omnibus and the horse railway car passing along the crowded thoroughfare, we do not look on it as an innovation, but as one of the necessities of the times. Few things strike the Englishman more when he lands on American soil, than the progress of the people in the means of locomotion. By land and by water the types are distinct, but the idea is the same. Our purpose at present is with the land. And here at the outset you are impressed with the largeness of the idea. Space to be traversed safely, speedily, and profitably has been the thought; and though in details there are many things yet to be improved, the unity of the idea has been kept uppermost, and to a wonderful degree received development. Part of the idea has been to bring the media of communication home to the very doors of the travellers,

into the very busiest quarters of the great cities. In the very centre of commerce, in New York, you may take your seat, and be either whisked off to "the far west," or set down a few yards off upon the line. You may be landed at the pier on the North River when the Hudson River train is passing along the bustling street; it will take you up to Albany, 144 miles off, or put you down at an adjoining avenue, or carry you to Fifty Second-street, four miles from the central terminus. This, however, is but a fragment of the system. Along the leading street, confining our remarks to New York for the sake of illustration, you will find certain lines directed towards the 2d, 3d, 4th, 6th and 8th avenues, as well as in Brooklyn, which may be compared with our Birkenhead, or more correctly with the Surrey side of London, so populous has it become. The iron way is sunk in the street after the manner of our own lines where the railway crosses a turnpike road upon a level, the flanges of the wheels sinking in a cavity, the surface of which is flush with the pavement. The carriages are like ours in height, but much larger, opening only at the ends, and capable of accommodating about eighty people. These cars, which are long in proportion to their breadth, rest at each end on four wheels, and have a pivot at each extremity by which they can safely turn round sharp corners and curves of short radii—the carriage, for the time, being the chord of the arc traversed. In the city, these cars are drawn by horses, with bells tinkling at their necks, and inside are fitted up with elegance and comfort. The uniform charge for travelling in the town is five cents for an adult, or 2½d., and three cents for children. The city cars, properly so called, are smaller than those which become joined to the engine beyond the limits of the town, and are more smartly painted. A bright red is the favourite colour in New York. In 1858, the number of passengers in these cars was very nearly thirty-five millions; and the totality of accidents on all the city roads was only twelve. The dividends ranged from 6 to 12 per cent.

Space, time, money, and safety are all secured by this city railway system, while the greater facilities for travelling vastly increased the number of those using the "cars." It is true that the horse-cars are not the only means of travelling from street to street, for along Broadway and many streets we find the "stages"—a kind of small omnibus constructed after the fashion of the hull of one of the river boats, and like those curious vessels, painted a bright white; but the "cars," drawn by horses along the iron rails are in the aggregate more largely used. An attempt was made some time ago to carry out the plan in London, but it was defeated mainly by the then Chief Commissioner of Public Works, who could see nothing in it but a company, for private ends, seeking a great monopoly. We wonder at the puerile

arguments of the then Sir Benjamin Hall. But truth will triumph; and a plan which has proved itself so efficient in New York deserves to be well considered in this country before it is rejected. Now, the subject is before the town in an almost accidental manner. The Harbour Board wished to rate Mr. Busby one shilling a run for the use of their line of rails for his omnibuses. Mr. Busby refuses to work them on such terms. Mr. Train, practically acquainted with the working of the American system, comes in and offers to take the contract, and will lay down a line in any suitable street, and place the proper kind of carriages thereon. The offer is excellent, and the proposals should not be rejected without very cogent reasons.

To a certain extent the plan has been tried in this town, and with much success; but what we have already seen conveys but an imperfect idea of what we have examined and approved of in America. Along lines not originally constructed for passenger traffic omnibuses have for some months been running; and though the lines are not a very favourable test, nor the vehicles on them like those of the American cities, they have certainly obtained a large share of public favour. The conviction is, that the horse-railway must come into use in our thoroughfares, and we would add, for its success, with an efficient system of "correspondence."

It is not sufficient to lay down a line along our docks. A line should run from Edge-lane along Upper Parliament-street and St. James's-street, meeting on its way transverse lines—one along Crown-street, Shaw-street and Netherfield-road to Kirkdale; another along the line of St. James's-road, Rodney-street, Clarence-street, Russell-street, Norton-street, St. Anne-street, Fox-street, and Great Homer-street, turning down Boundary-street at the north; another along Great George-street, Renshaw-street, Lime-street, and meeting the last branch at St. Anne-street; and another branching off at St. George's-hall, down St. John's-lane, the declivity of which will present no practical difficulty, Manchester-street, and Dale-street to the Exchange. John-street could then be taken up as a branch line, running along to St. James's-street. The northern terminus of the line should be as near to the Sandhills station as possible, so that passengers could easily proceed by rail to the outposts with the shortest distance between the lines.

Were these all laid down, and good carriages put upon them, with a uniform charge of 2d. a head for adults, and an extra penny for each correspondence, the pecuniary results would soon yield a satisfactory solution of the question. Our town would have its network of intercommunication, and the community would not be slow to mark the advantage by their support.

Times' City Article, Feb. 10, 1860.

Mr. G. F. Train, of New York, has proposed a system of horse railways for Liverpool on the American plan. The time seems approaching when the introduction of some facilities of this description will be witnessed in all large European towns, and the method may possibly be promoted by a contrivance lately brought forward by a Mr. Curtis for enabling carriages to pass off and on a line of rail at pleasure. There are five city railroads in New York operating on a total length of 44 miles, constructed at an aggregate cost of £1,000,000, which pay dividends of from 6 to 12 per cent., and are alleged to have carried 34,000,000 passengers in the year 1858. At Boston and Philadelphia, also, the plan has long been resorted to, and the busy people of all these cities would, it is believed, view a return to the old condition of traffic with as much surprise as a retrogression from gas to oil.

From the London Spectator, Feb. 25, 1860.

More than thirty-four millions of passengers passed over the horse railways of New York and Brooklyn in 1858, with only twelve accidents. "Thirty-four millions! More than the population of the United States and Canada, or of Great Britain and Australia—one-fourth the entire number of passengers carried on the railways of the United Kingdom the same year; or, to make it more striking, three times the number carried in Scotland; and four times as many as passed over all the Irish railways, and yet only twelve persons injured by accidents!" This extract alone, which we take from a pamphlet by Mr. Train, published by Messrs. Sampson, Low and Co., ought to make it plain, even to the intelligence of a Marylebone vestryman, that no apprehension of danger need delay the adoption in London of a system that has been so well tested in the United States, and which has there been productive of such inestimable advantages. In a recent visit to his native country, Mr. Train found railway cars displacing the old-fashioned omnibuses in the crowded streets of all the great cities of the Eastern States. Their history in America is that of every practical labour-saving invention all the world over. The people at first opposed them and have ended by advocating them; and "Americans would miss their railway car as much as the English would their penny-postage system." The tramways being flat offer no obstructions to the ordinary traffic; on the contrary they facilitate it doubly by expediting the passage of the omnibus cars, and by affording a smooth track on which

other vehicles may run more freely than on other parts of the road. They monopolise no space. The greater portion of drays, carts, 'buses, private carriages, occupy the rail, turning out only when the passenger car arrives, when they again take the track, as it is so much easier for the horses, and less wear and tear for the teams."

From a Londonderry Paper, Feb., 1860.

The name of the author of this pamphlet, if not assumed for literary uses, as we presume is not the case, bears a singularly coincident relation to the subject of his essay. The writer's object is to get rid of the clumsy, inconvenient, and, in large towns and cities, the perilously obstructive system of omnibuses, and to substitute in its room the American plan of horse railways; in other words, of passenger carriages drawn upon tramways by horses, thus avoiding altogether the delays, dangers, and other annoyances of the old system. The author has collected from every available quarter an immense quantity of information upon this subject, according to Sir R. A. Ferguson, Bart., M.P., all due praise for his legislative efforts in favour of Irish tramways, and concluding with a hope that, in its passage through parliament, the bill may be extended to the whole United Kingdom. This, in fact, is the main object of the publication, the author heartily taunting the English public, and especially the merchants of England, with the disgrace of permitting Ireland to outrun them in the career of horse railway progress! Mr. Train's pamphlet is very interesting, and it deserves a careful perusal, as the superiority of his plan to that hitherto current is a matter of absolute demonstration.

From the *Dover Chronicle, and Kent and Sussex Advertiser*, Feb. 25, 1860.

The present century, among all the various social improvements it has witnessed, has been peculiarly productive in the modes of transit, whether by water or by land; and no sooner has one introduction been brought to maturity than another has superseded it. The old rumbling hackney-coach was thrust on one side by the commodious omnibuses and the light cabriolet, and now these in their turn, we suppose, are to give way to the genius of speculation. Mr. Train, after commenting on the more liberal idea taken of the scheme by the Americans, French, and Irish, comments somewhat severely on the apathy or prejudice of the English, and is not sparing in his strictures

on Sir B. Hall in the remarks made by that gentleman on the occasion of a deputation waiting him on the subject. The author, as may well be imagined, is very sanguine—it is natural to projectors so to be; he sets forth in detail his plans and anticipated advantages, and we must confess they are highly deserving consideration. His scheme is to lay iron rails in longitudinal sleepers in the different streets, on which are to be placed railway cars, drawn by horses; by this means, he says, that all the accumulated evils of metropolitan travelling will be avoided, and the transit from street to street become a pleasure. There is much sound sense, with, perhaps, a little speculative theory in his observations, and we heartily commend the pamphlet to public consideration.

From the Morning Chronicle.

London, Paris, and New York, are all suffering from congestion in their great streets. The disease has been of rapid growth. Omnibuses—the first form of popular “accelerators”—now serve only to aggravate the original disorganization. Various are the suggestions—beautiful in theory, but unprofitable in practice—for restoring a more natural circulation. Streets are widened at an amazing expenditure, but the improvement only serves to develop traffic hitherto hidden from general view. Tunnels have been made, and bridges built, which ought to be “warnings,” yet they are not. “Metropolitan railways” are projected, which, by a singular perversity, will be found to give the very smallest possible facility at the largest possible cost. One scheme, by running underground, seems determined to do without local traffic; and it must exclude one-half of the population—women! Such are the achievements of London enterprise.

Do they do *these* things better in France? We have before us a description of their latest improvement! It is a railway waggon for the conveyance of passengers *through* Paris. It has eight wheels, it is 30 feet long, and 9 broad. Four horses draw it. Each carriage will “accommodate” 100 passengers inside, and as many outside. There is, besides, a proposal to construct a railway *round* Paris. But how are a railway belting Paris, and a monster omnibus carrying 200 passengers, to remove street obstructions.

New York appears to have selected the practical remedy. By the system adopted there, carriages—light, roomy, airy, and handsomely constructed—are drawn by two horses on rails, so arranged as in no way to impede the general traffic. This contrivance at once reduces the labours of paving com-

mittees and the assessment for highway rates. Every house on the route is a "station" for passengers. Even ladies in full dress enter these vehicles, and alight from them without annoyance. All the traffic is managed as smoothly as that of a drawing-room. Among the thirty-five millions conveyed last in New York, not one case is recorded of crushed corns or of an umbrella being used to arouse a conductor's energies. The people go and come as they list; the streets remain uncrowded; and all this aristocratic comfort is effected at "democratic prices." With this practical remedy for guidance, why should not the American horse railway be at least attempted and put to the test of proof in London, before making serious additions to the costly experiments of our metropolitan street menders—our modern highwaymen?

From the *Liverpool Times*, April 4, 1860.

Foremost among the necessary public evils of all large towns has been the present common omnibus. In such places the distance of the suburban from the central districts, where daily business or pleasure congregates tens of thousands of both sexes and all ages, has rendered the employment of a cheap mode of conveyance indispensably requisite; and those residents in or near large towns who have not stately or occasionally made use of the omnibus are certainly the exception to the general rule. In the absence of anything better, therefore, all must admit that the omnibus has been a great public convenience; and we may also concede the fact that in many towns, if not also in Liverpool, recent improvements in this popular means of transport from one remote part of the town to another, have done much to make it so far adequate to the work it has to perform. That irresistible law of progress, to which we ourselves and everything around are subject, has now, however, developed an invention in this department of social economics, which, we feel warranted in saying, proclaims that the age of omnibuses in crowded cities has passed, and the age of horse railways has commenced. If, therefore, we would not be behind the age we live in, the vast cavalcade of lumbering machines which now encumbers our streets must speedily disappear and give place to the smart and commodious city railway car. Now that we are offered an improved substitute, we will not much longer patiently endure the evils of the old system. Who has not suffered serious annoyance, if not injury, from having to submit to be crammed into one of these confined and too often overcrowded vehicles? In wet weather, when all the passengers perhaps have been caught in a heavy shower, from which they were only too glad to escape, and when everybody is benevolently disposed to crush him or herself into the

least possible space, for the benefit of those who besiege the entrance after every seat is occupied, with pitiable and imploring mien; it often happens that every inch of sitting and standing room is so completely occupied, that everybody's nose seems to be brought into less than pleasant contact with somebody else's elbow, and every one is made to feel as if packed in a vapour bath, produced by the combined heat operating on the moisture imbibed by the garments of the occupants. Having no choice of companions on these occasions, this modified process of wet packing is sometimes rendered all the more painful to endure from unfortunate proximity, perchance, to a baker's lad with his dusty coat, or it might be to a youth whose calling of an opposite *complexion* may be equally indispensable to society at large, although their presence is never very desirable as fellow-travellers inside the 'bus. The good-natured are nowhere more frequently victimised than in the 'bus. After the whole inside accommodation has been more than sufficiently occupied, it not seldom happens that up comes an anxious mamma, with her interesting progeny, one in each arm, and an older one, or more, bringing up the rear, hurrying to get out of the rain. Mamma and her anxious offspring look wistfully into the already suffocating interior, and a response is sure to be given by some good soul who is as unable to stand his ground against such an appeal as he is unwilling to get out—and so another effort must be made; and the result is that the submissive crowd, become as densely packed as herrings in a barrel—three or four of the passengers enjoying the felicity of supporting each a juvenile on his knee, while mamma has squeezed herself, crinoline, hoops, shawls, and wet umbrella between some agreeable people, whose suffering forms are entirely covered from human view, and who are only kept from open remonstrance by appropriating to themselves the "pleasures of hope," in the belief that such an excruciating sad condition cannot last very long. If such is the state of matters in wet weather, how much better is it in the hot season—when a good hearty shower would be a treat? When the temperature is very high, the inside of a 'bus becomes scarcely preferable to a hot and ill-ventilated stable—close, confined, and unpleasantly odorous. See the panting, perspiring passengers inside, poking at the little wooden ventilators to keep them open. It is of no use. The young men outside immediately kick them close again with their heels, and the only relief is the prospect of a speedy release. In warm weather as in wet, then, the omnibus nuisance is equally unendurable, and never submitted to where it can be avoided. Nor let it be said that we have chosen two extremes. How stands the case in moderately fine weather? Why, these machines for the most part only get along at the "slow coach" pace of about four miles an hour, or little better; and, let us ask, who that is able to walk two

or three miles betwixt home and business would submit to be trundled along in in a nasty 'bus at that rate, if he can perform the distance in the same time *gratis*, with the pleasure of the exercise into the bargain? Nobody. All these and many more objections to the present omnibus are quietly passed over so long as we can get nothing better; but they startle us into action the moment we are offered a substitute which promises to remedy the evils we have been enduring. So it is at the present moment. The Street Railway is a fact. It has been tried and it has succeeded. We are now to have railways in our cities and towns, to be wrought by horse-power. In the city railway car there will be no crowding, no want of ventilation; and the rapid yet easy motion of the conveyance will present an inducement to all to travel by it. The streets through which the omnibuses traffic chiefly runs will be freed from the noise and confusion at present so often produced by the transit of the various omnibuses. Experience has shown that all those evils may be overcome and all these advantages secured without risk to life or limb, or inconvenience to the traffic of crowded business streets. Although England, first in iron railing the country with steam, is last in iron railing the city with horse-power, the enterprise that accomplished the former will speedily stimulate the latter improvement. The project is no dreamy speculation. In the crowded and busy thoroughfares of Boston, New York, Philadelphia, Baltimore, St. Louis, Cincinnati, and others, the railway cars have long displaced omnibuses. There is certainly nothing in or about Liverpool or Birkenhead to prevent the city railway car from being as easily and extensively adopted as it has been in those transatlantic cities, whose inhabitants, albeit at first jealous of the change, would now miss that mode of conveyance as much as we would our penny postage system. In short, those who are best capable of judging, entertain no manner of doubt as to the speedy adoption and entire success of the new mode, in every considerable town in England. We cannot stay at present to combat all the sage but stale objections of those antiquated wiseacres who see danger in every important change. We would bid Liverpool look to her laurels, if she would not lose the opportunity of carrying the palm, as having been the first to introduce this great improvement in cities. At the same time, *palmarum qui meruit ferat*: and we congratulate the Birkenhead Commissioners on the liberal and enlightened spirit in which they have entertained Mr. Train's fair and spirited proposal to construct a Street Railway from Woodside to the neighbouring townships at his own risk, and without the guarantee of any preference. The fact is there is really no risk about it. It will be a great success; and we heartily wish Mr. Train health and strength to put forth his undoubted ability to give effect to his proposal; and we are sure that all the favour he asks is a fair field, and all the reward he cares for is to see that which

is to follow—the universal adoption, in this country, of one of the greatest practical, labour and time-saving inventions of the day—the city Street Railway.

From a *Dublin Paper*, April 24, 1860.

THE FIRST CITY TRAMWAY IN EUROPE.

On Thursday last the Commissioners of Birkenhead decided on granting permission to Mr. George Francis Train, of the American and European Tramway Company, to lay down rails similar to those now so extensively used in the principal cities of the United States.

The rails are to be laid at first from the Ferry to the Park, which is the great point of attraction in the summer, and passengers will be carried direct to the principal entrance. Mr. Train and Mr. Andrew Palles, the engineer to the company, attended with a beautiful model of the proposed car, which is large, airy, and comfortable. A peculiarity in the rail which they propose using is, that it is almost a flat piece of iron, presenting no obstruction to other vehicles passing along or across it, and quite different from the general idea erroneously formed of a rail as used on locomotive or steam roads. Great credit is due to Mr. Train, who with the usual American energy has most perseveringly laboured to introduce his proposed system, and which we understand he purposes extending through Europe. We trust the project may be remunerative. Mr. A. Palles has been extensively engaged in the construction of tramways in America; his engagement by the company is a guarantee that the project is based on practical and scientific experience. The plans are in active preparation, and the cars will be running in less than three months.

From the *Birkenhead Advertiser*, April, 1860.

STREET RAILROADS FOR BIRKENHEAD.

The last meeting of our commissioners was both important to the rate-payers of the township and interesting to the advocates of progress in this country. There has long been experienced a pressing want of facility for speedy, safe, convenient, and, at the same time, cheap transit through the streets, especially in the more important and populous towns and cities of the United Kingdom. The present omnibus system is admittedly imperfect in all these respects, being slow, dangerous and uncomfortable. Any suggested

improvement is, therefore, worthy of prompt attention, and street railroads, for some years in satisfactory operation in America, is particularly deserving of candid and careful consideration. This mode of street locomotion has been brought under the notice of the authorities of this country by Mr. George Francis Train, an enterprising American, in a very valuable pamphlet addressed to the President of the Board of Trade, in which he explains its working in the United States, and clears away any misconceptions that may have been formed as to the desirability of its adoption in this country. We have been favoured with a copy of this work, and must admit, after minutely examining the evidence, which is of a most unexceptionable character, that his conclusions in favour of its introduction into Europe are both natural and logical. We are not alone in this opinion, for the newspapers here seem sufficiently alive to the inconveniences of the present lumbering omnibus, and hail the proposed inauguration of the American railroad car as a public boon. Even those antiquated beings who revere with absurd reverence the calcined ashes of ancient jog-trot usages, simply because they are time-honoured, and who, if they cannot prevent their advance as individuals, yet would fain hold the world in the leading-strings of perpetual childhood, are constrained to confess that the omnibus of to-day is a nuisance, offensive to public health, and almost useless as a public convenience. They even grant—a great concession on the part of those Tory admirers of all pertaining to the past—that the American system is a decided improvement, but are content to cross their arms in listless apathy, and deny the practicability of its adoption in England. And certainly, if it rested with such men, our “Yankee cousins” would luxuriate for ages to come in the amplitude of their railway car, while the people of this country still suffered from the inconveniences of the noisy, close, and crowded vehicle that now plies on the streets of Birkenhead and Liverpool. Happily, however, if the go-ahead Yankee has been the first to break through the old omnibus system, there are also advocates of progress in England who are quite ready to give the American railway car a fair trial; and it is truly pleasing to us that they should be found among those who are entrusted by the rate-payers with the management of the affairs of this township. We have been, from the first, in favour of the adoption of the system in the United Kingdom, but when we found that the promoters confined themselves to addressing the unwieldy corporations of the larger towns and cities, we greatly feared that the railway car would become so warped in the meshes of red-tapery, that its wheels would be eaten with rust ere they could be put in motion. It was with satisfaction, therefore, that we first heard that Mr. G. F. Train had submitted a proposal to our commissioners’ board, in which he undertook, at his own expense, to lay down tramways from Woodside to

Oxton and Claughton; for, believing that only practical ability was wanting to recognise its many advantages, we felt confident that the business habits and experience of Messrs. Laird, Rea, Harrison, Baylis, Bradley, M'Gill, Whittle, and others, would readily acknowledge the desirability of the introduction of the railway car among us. And, thanks to the absence of that formality that so impedes the movements of the pompous civic bodies of larger towns, and trips the reformer at every step, we were not disappointed in our anticipations. The last meeting of the commissioners, as we remarked at the outset of this article, was an important one, for it resulted in the unanimous approval of the system, and the appointment of a joint-committee to enter into an arrangement with Mr. Train, if they concurred as to the details of an agreement. Anxious as we were and are to see the system fairly in operation here, still we would scarcely have considered it a judicious proceeding to close with Mr. Train without first making proper inquiries into his securities for carrying out his proposal, and taking into consideration the details of his plans—such as the line of route, construction of carriage, and other practical and engineering matters.

From the *Engineer*, London, April 27, 1860.

✓ The township of Birkenhead appears likely to be the first in the kingdom to adopt what must be considered as one of the most important improvements of the age. An enterprising American, Mr. George Francis Train, of New York, has been for some time endeavouring to obtain the attention of various public bodies in this country to the advantages of the street railway system now so generally and so successfully adopted in the United States. Taking the opportunity afforded by the action of the Mersey Dock Board at Liverpool, in imposing a prohibitory toll upon the omnibuses using their line of rails along the docks, Mr. Train came forward with an offer to pay the toll if allowed to start and run a line of railway omnibuses upon the American plan, a plan very different, however, from the contrivance in Paris, called the *Chemin de fer Americain*, which has been so often referred to in disparagement of the system of street railways. By some means, Mr. Train's proposal was shelved, and he has accordingly been on the look-out for more public-spirited boards, one of which is evidently that of the Commissioners of Birkenhead. Mr. Train having offered to put down lines of street railways at his own expense, and to work them with horse-drawn carriages, the Birkenhead board referred the matter to their surveyor, Mr. Edward Mills, who has reported favourably upon the whole system. On Tuesday week, at an

adjourned meeting of the board, Mr. Mills' report was adopted, and a joint committee was appointed to conclude arrangements with Mr. Train. There were remonstrances, it is true, from citizens residing in some of the thoroughfares through which it was proposed to extend the new lines of communication, but other routes will probably be adopted, and the remonstrating citizens will probably be the first to regret their folly. As to the immense advantages attending the working of the railway omnibus system there can be no doubt, and experience on the largest scale abroad, and the most careful investigation here, have alike shown that all the apprehensions of danger and inconvenience which have been excited in the minds of those who are unacquainted with the system, are altogether unfounded. We have argued the engineering aspects of the question so often in these columns, that it seems almost supererogatory to repeat our former conclusions. It is undeniable, however, that the power of a horse is more than doubled upon a street railway as compared with his draught on an ordinary pavement; and on account of this fact, a given number of passengers may be carried, at a speed of eight or nine miles an hour, upon rails, in not more than half the number of vehicles requisite upon a pavement, and consequently with but little more than half the bulk, wear and tear, and danger. As the wheels of the railway omnibuses are placed beneath instead of at the sides of the body, the carriages occupy much less width than common omnibuses, a consideration of great importance in narrow streets. The railway carriages are completely under control at their highest rate of speed, and are safer against collisions with each other and ordinary vehicles than are common omnibuses. Mr. Mills recommends a single line of way for the streets of Birkenhead, this line to be laid in the centre of the street. The railway-cars can thus pass without disturbing vehicles standing at shop or house doors. The pattern of rail likely to be adopted is one which will cause no obstruction to the ordinary traffic, but will, to a great extent, accommodate it, as all vehicles will be at liberty to make what use of the railway they like, so that they do not needlessly obstruct the omnibuses specially constructed for it.

From the *Liverpool Albion*, May 6, 1860.

MR. TRAIN'S STREET RAILWAYS.—If the gentleman whose duty it was to bring this novel proposal before the public were endowed with far less perseverance than is possessed by Mr. Train, we soon should have an opportunity of judging as to the adaptability of horse-railways to the traffic of our streets; but with sanguine zeal which he exhibits there can be little doubt that the

general adoption of road railways in this country is but a question of time. No one who has examined the very beautiful models in Mr. Train's possession, and who has listened to his lucid explanations, can see the shadow of a reason why an opportunity should not be given for ascertaining what advantages would be gained if these convenient and commodious vehicles were allowed to be introduced into our thoroughfares. If their introduction obtained for us but a tithe of the benefits which Mr. Train mentions in order to recommend them to the notice of the public, there would be quite sufficient grounds for at once laying down the line. Perhaps the greatest advantage to which they would conduce would be the systematizing of the traffic. They would move along our streets in an undeviating course, at a uniform speed, and with the regularity of an automaton ; and, while their immense size would lead to a diminution in the traffic, their capacity of being stopped in a few seconds would lessen the chance of accident, and tend greatly to the convenience of passengers. Their wheels being underneath instead of at the side, they may pass up the narrowest street without danger to pedestrians, and the power of a horse being three or four times as great upon a railway as on a road, fewer horses would be required, and, strange to say, those which were employed would grow fat. It seems very probable that the Birkenhead Commissioners will give the scheme a trial, and that before long a practical proof will be given that many advantages would attend their introduction into our streets.

ADDENDA.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THIRTIETH MEETING,

Commencing WEDNESDAY, 27th JUNE, 1860.

UNDER THE DIRECTIONS OF THE FOLLOWING OFFICERS:

President.

THE RIGHT HON. LORD WROTTESLEY, M.A., V.P.R.S., F.R.A.S.

Vice-Presidents.

THE EARL OF DERBY, K.G., P.C., D.C.L., Chancellor of the University of Oxford.

THE REV. F. JEUNE, D.C.L., Vice-Chancellor of the University of Oxford.

THE DUKE OF MARLBOROUGH, D.C.L., Lord Lieutenant of Oxfordshire.

THE EARL OF ROSSE, K.P., M.A., F.R.S., F.R.A.S.

THE LORD BISHOP OF OXFORD, D.D., F.R.S.

THE VERY REV. H. G. LIDDELL, D.D., Dean of Christ Church Oxford.

CHARLES G. B. DAUBENY, M.D., LL.D., F.R.S., F.L.S., F.G.S., Professor of Botany in the University of Oxford.

HENRY W. ACKLAND, M.D., F.R.S., Regius Professor of Medicine in the University of Oxford.

WILLIAM F. DONKIN, Esq., M.A., F.R.S., F.R.A.S., Savilian Professor of Astronomy in the University of Oxford.

General Secretary.

THE REV. ROBERT WALKER, M.A., F.R.S., Reader in Experimental Philosophy in the University of Oxford; Culham Vicarage, Abingdon.

Assistant General Secretary.

JOHN PHILLIPS, ESQ., M.A., LL.D., F.R.S., F.G.S., Reader in Geology in the University of Oxford; Oxford.

General Treasurer.

JOHN TAYLOR, ESQ., F.R.S., 6, Queen Street Place, Upper Thames Street, London.

Local Secretaries for the Meeting at Oxford.

GEORGE ROLLESTON, M.D., F.L.S., Lee's Reader in Anatomy in the University of Oxford; Oxford.

H. J. S. SMITH, ESQ., M.A., F.C.S., Balliol College, Oxford.

GEORGE GRIFFITH, ESQ., M.A., F.C.S., Jesus College Oxford.

Local Treasurers for the Meeting at Oxford.

THE REV. EDWARD HILL, M.A., F.G.S., Sheering Rectory, Harlow, Essex.

THE REV. JOHN GRIFFITHS, M.A., Oxford.

The annual meeting of the British Association, says the *Times*, commenced (Oxford, June 27), this day by a grand gathering of *savans* and others in the Sheldonian Theatre, one of the ornaments of this ancient city. The theatre was well filled in every part, with the exception of the upper gallery, which might have contained double the number that actually occupied it. Fully one-third of those present were ladies, who by their gay costumes greatly enlivened and diversified the assemblage. Among the *savans* present in the semicircle we observed Sir David Brewster, Lord Wrottesley, Dr. Whewell, Professor Phillips, Professor Sedgwick, Mr. W. Grove, B. C., the Bishop of Oxford, Dean Liddell, Dr. Ackland, Professor Walker, Mr. Prestwich, &c. The theatre began to fill soon after 3 o'clock; at 10 minutes past 4 the great doors were thrown open, and the procession entered. Immediately after the University beades came his Royal Highness the Prince Consort, President of the Association; next came Lord Derby, Chancellor of the University; then Dr. Jeune, Master of Pembroke College, and Vice-Chancellor; and finally some members of the Prince's suite.

I cannot better appreciate the courtesy received from Professor Phillips and the President, Vice-Presidents, Secretaries, and Committee on Mechanical Science, in permitting me to explain the Latin and Greek of Street Railways to the distinguished *savans* that have congregated at this Annual Meeting of the British Association, than by recording their names herewith, and in concluding my Pamphlet with the following discussion that so ably endorses the views expressed therein.

NAMES OF THE OFFICERS AND COMMITTEE OF

SECTION G.—MECHANICAL SCIENCE.

President.—W. J. Macquorn Rankine, LL.D., F.R.S., Professor of Engineering, Glasgow.

Vice-Presidents.—J. F. Bateman, F.R.S.; W. Fairbairn, LL.D., F.R.S.; J. Glynn, F.R.S.; Admiral Moorsom; Sir John Rennie, F.R.S.; Marquis of Stafford, M.P.; James Walker, C.E., LL.D., F.R.S.; Professor Willis, F.R.S.; T. Webster, Q.C., F.R.S.

Secretaries.—P. Le Neve Foster, M.A.; Rev. Francis Harrison, M.A.; Henry Wright.

Committee.—Robert Abernethy, C.E.; J. G. Appold, F.R.S.; P. W. Barlow, F.R.S.; Captain Sir E. Belcher, C.B.; Captain Blakely, R.A.; Earl of Caithness; W. Capmael; E. A. Cowper; J. C. Dennis, F.R.A.S.; Professor Downing, LL.D.; J. Elder; Hon. L. A. Ellis, M.P.; Admiral FitzRoy, F.R.S.; W. Frowde, C.E.; Captain Galton, R.E.; L. Gordon, C.E.; Professor Hennessy, F.R.S.; Charles Liddell, C.E.; J. E. McConnell, C.E.; E. Macrory, M.A.; Professor J. C. Maxwell, M.A.; John Moffat, C.E.; James Nasmyth, F.R.S.; W. Neilson, C.E.; J. Oldham, C.E.; Professor Peirce; R. Roberts, C.E.; C. W. Siemens, C.E.; Werner Siemens, C.E.; W. Smith, C.E.; B. B. Stoney, M.R.I.A.; J. Willett, C.E.; Captain Woodall, M.A.

QUESTION FOR DISCUSSION,

Tuesday, July 3rd :—

“STREET RAILWAYS AS USED IN THE UNITED STATES,” (WITH
A MODEL,) BY GEO. F. TRAIN, OF BOSTON.

From the Oxford Journal.

This paper, which was admirably read by the author, excited considerable interest and amusement to an overflowing audience, and gave rise to one of the most able and animated discussions which has occurred during the present meeting of the Association, inasmuch as it elicited remarks from several distinguished engineers, and other gentlemen, who had devoted considerable attention to the subject, and whose opinions upon it carried great weight.

In reply to questions put by the President, Professor Rankin

Mr. Train stated that his car, as shown by the model, would accommodate inside and out 60 passengers; that the weight of the car was two tons, but that the gross weight of the load would necessarily depend on the weight of the passengers. Two horses would be equal to a gradient of 1 in 30, but that for gradients exceeding that an additional horse might be employed. On his street-rail two horses would take five times more than two on the ordinary road.

Admiral Taylor said he admired the invention very much on account of its simplicity and the great advantages which it offered, but he feared that the talented and ingenious inventor would find, as he had done, a great disinclination to adopt anything which had for its object the prevention of danger or accident, because the very apprehension of either unsettled the public mind. He could speak from experience, having invented ships, railways, and various other contrivances to give the public additional safety and security. As an illustration of this, he had suggested that there should be between the tender and carriages a lumber carriage attached to every train, so that the guard in charge of it might, in case of approaching danger, release the carriages and prevent accident, but he could not prevail on any railway company to adopt his suggestion, because the very adoption of it implied an apprehension of danger, and made persons almost anticipate it.

Mr. Arthur Ryland, of Birmingham, enquired whether the proposed street railway would not interfere with other carriages, unless there were two sets of lines, in which case they would require wider streets.

The President suggested that Mr. Train should defer his reply to any remarks until the close of the discussion.

Dr. Carpenter, of Warrington, said he had just returned from America, where he had travelled a great deal in these street railway cars, and was strongly impressed with their great advantages. In almost every large city, such as Boston, New York, Philadelphia, Cincinnati, he had seen them in operation, and could truly endorse every one of Mr. Train's statements respecting them, and that no difficulty whatever attended them. The best proof of that was that they had already been in use some time, and that in other large towns these street rails were being laid down. One of the great advantages of these cars was the facility of ingress and egress which they afforded at each end, even when they were in motion. They afforded plenty of room for the passengers; and, in consequence of carrying so many, the fares were as low as 5 cents., or 2½d., for almost any distance. The last speaker (Mr. Ryland) appeared to think that street railways would be inconvenient to the general traffic, but it was not found so at Boston, which was most like an English town, on account of its crooked streets; the city was limited in its room, being built on a peninsula, but the system of these horse railway cars worked remarkably well. When all the omnibus traffic and general traffic was one line, and one of these cars took the place of so many other omnibuses, then the streets were considerably lessened by their traffic and confusion. In streets which were very narrow, the lines might be laid in parallel streets, as was the case in Broadway, New York, and the same might be done in the Strand and at Ludgate-hill, in London. In places like Manchester and Liverpool, he (Dr. Carpenter) could not imagine how it was they had not availed themselves of this great improvement. He did not wonder that the Americans saying that we were wedded to our old-fashioned ways and notions; but let an Englishman once travel on their street railways, and he was satisfied that he would bring home a satisfactory account of them. One great advantage was the extreme quickness with which you travelled from place to place; whereas here, if you got in a bus to ride from the Strand to the Bank of England, you were often strongly impressed with the notion that you might save time by walking the distance. In some streets, which were wide, double lines might be laid down, and single lines in narrower ones; and, where the ascent was steep, the difficulty could be obviated by the employment of an additional

horse on that particular part. He was delighted to hear that the street railway system was about to be adopted at Birkenhead; the people in the North were generally foremost in adopting what was good, and he hoped that such a determination would spread among the slower people in the South, for he could assure them that every statement made by Mr. Train was correct and reliable.

Mr. W. Smith, civil engineer, Adelphi, London, said that some five years ago he was in America, and had a very pleasurable recollection of riding in these street railway cars, for the systematic manner in which the whole matter was organised left a strong impression on his mind as to their advantages, and a great desire to see them introduced into this country. The convenience attending them was so striking that it was a matter of surprise that a Mr. Train, some twenty years ago, had not made up his mind to introduce them here, for it only wanted a little effort to make them as general here as they were in America. Notwithstanding what had been said about crooked streets and Ludgate-hill, there was no question that there was enough momentum and energy and skill in Mr. Train's composition to overcome all these difficulties. (Laughter and applause.) He was glad that it was about to be adopted at Birkenhead, and he hoped that it would be extended to Manchester, Liverpool, London, and all large towns where it was most wanted, and would greatly relieve the pressure in our streets. He found that in going from his office in the Adelphi to the Bank of England by an omnibus it often occupied from twenty-seven to twenty-nine minutes, whereas in a cab, the distance could be done in nine or ten minutes; therefore, if merchants would value their time by a money rule, they would see the necessity of adopting a more speedy mode of getting from one place to another in the crowded thoroughfares of London.

In reply to a question by Mr. Newman respecting goods traffic, Mr. Train explained that the lines might be used for passenger traffic by day and for goods by night.

Dr. Steadman said he feared that in case of a stoppage on the line some inconveniences might be felt but doubtless Mr. Train was prepared to meet that difficulty, and would explain how he meant to obviate it.

Mr. Le Neve Foster, Secretary to the Society of Arts, said that this was a most important subject, and they were much indebted to Mr. Train for bringing it forward and telling them what had been done and was still being done with respect to it in America. The traffic in the London streets was the great topic of the day, and although it had been before the public for two years, he had never had the opportunity before of hearing what had been done in America. The thing was so simple—and its simplicity was its great

beauty—that it was a matter of surprise that it was not more generally adopted, especially as it had worked so well in America, was free from any difficulty, and that the lines were kept clear, notwithstanding the traffic. About two years ago a bill was brought into Parliament for a tramway in London, but in consequence of vested interests, and the Chairman of the Board of Works being opposed to it, it was thrown out. He hoped, however, that it would be tried in London, but it would require an enormous amount of energy and momentum.

Dr. Carpenter remarked that one of the great objections to Street Railways was that a stoppage in any part would inconvenience the rest, but a plan had been introduced by Messrs. Mayne to obviate that by having an eccentric flange. There was a plain wheel, and at the side an eccentric ring or disc, and by turning a lever it converted it into a railway carriage, and by turning it back it got on the common road. (Applause.)

A gentleman, who is an engineer of high standing, but whose name and address did not reach us, stated that when he was at Baltimore he was surprised at the ease with which the Street Railway cars ascended steep hills, and the facility with which they were checked in descending. From what he had seen in America, and the system being in operation there so extensively, with a perfect freedom from accident or inconvenience of any kind, there was no valid objection to it, either on account of steep ascents, sharp curves, or interference with the general traffic.

The President said that before Mr. Train replied, he should venture to offer a few remarks on a subject which was so deeply interesting to the whole community. With respect to the system of Street Railways, it would doubtless have been introduced and adopted before now had it not been that the public attention, and the attention of engineers, had been directed mainly towards perfecting the railway system, which comprehended a wider range, and was not restricted to large towns or to a locality. At the same time he was not insensible of the value of the system of Street Railways, advocated so ably and so successfully by Mr. Train, for it so happened that he was well acquainted with them, his father and himself having constructed one, where they use to convey 40 passengers with one horse up ascents varying from 1 to 66 to 1 in 40, at the rate of 5 miles an hour, their average speed on the level being at 10 and 12 miles an hour. They had level crossings, but yet met with no accident, and although there were continually trains of coal waggons, no difficulty was found in passing them; and there was this convenience, that they could stop when they liked, almost instantaneously, and set down a farmer

